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THE MARKET FOR EIGHT FRESH VEGETABLES
IN WESTERN CANADA

E. E. R. King

Dr. Kowalk

Economics Division
Canada Department of Agriculture

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INTRODUCTION

From time to time comments are heard upon the large proportion of fresh vegetables that are imported annually into Western Canada. Many of the vegetables mentioned are commonly grown in family gardens in all parts of Western Canada. Often reference is made to the irrigation lands in Southern Alberta as potential areas for the production of a number of these specialty crops, and it is said that the production is stifled by an "unorganized" market. The market, it is maintained, "is there" but the Alberta producers are unable to capture it because of barriers in the chain of marketing. The barriers, it is suggested, are the lack of contact between the farmer and the wholesale dealers, and the lack of imagination on the part of the producer or the middleman to place Alberta-grown produce in fancy containers and thereby compete with imports on the same footing. Men in the wholesale trade are quick to mention that there is a lack of continuity in the local supply of many fresh vegetables. Wholesalers point out that many local growers do not take care in the grading of their produce and attempt to sell small lots of malshaped vegetables that generally the consumer will not accept. The wholesalers also say that in some instances local growers are unreliable; that frequently local growers are unable to supply specified quantities at an agreed time; and that sometimes local growers try to take advantage of the wholesaler by first peddling their produce directly to retailers or to consumers and then, as a last resort, offering the residue to the wholesalers. On the other hand, local growers claim a disadvantage in bargaining power when they sell their produce to wholesalers. They picture themselves as individuals pitted against a large corporate firm, with large capital reserves, that can dictate the purchase price. The growers also claim that wholesalers are unwilling to disrupt their regular line of supply in order to make purchases from local growers.

Regardless of the validity of the above suggestions, there are fundamental reasons why some vegetables are produced commercially in considerable volume in Alberta while others are not. This study examines the market for eight fresh vegetables in Western Canada with a view to casting light on these reasons. It also considers the potential market for added supplies of these vegetables for Alberta producers in the near future.

The eight vegetables that have been selected in this study are as follows: cabbages, carrots, celery, corn, onions, potatoes, tomatoes and turnips. Six of these vegetables are being grown in Alberta on a commercial scale. The remaining two, tomatoes and celery, are not yet but may have possibilities in this regard. In addition, of all the fresh vegetables sold, the eight selected rank among the highest according to the quantities that enter the commercial markets in Western Canada.

It should be emphasized that this study is strictly an analysis of the markets for fresh vegetables in Western Canada. We are dealing with vegetables that are grown in Alberta on a seasonal basis, and they are for the most part highly perishable and consequently must be marketed

on a seasonal basis. An analogy should not be drawn between the production of vegetables in Alberta for the fresh market and those which go into the processed market. The final product of processed vegetables, of course, can be stored for almost an indefinite period of time, and therefore their market structure is entirely different from that of fresh vegetables.

The data upon which this study is based are the quantities of the eight commodities that have been imported into the four Western Provinces and the unloads of domestic-grown produce at six major cities in Western Canada.^{1/} From these data an estimate was made of the size of the commercial market in Western Canada for each of the eight vegetables. The size of the commercial market is defined here as the quantity of a commodity that is sold to wholesale firms and to licensed vegetable dealers during the period of one year, July 1 to June 30. Data were available for a five-year period July 1, 1955, to June 30, 1960, and the estimates of the commercial markets, referred to above, are based upon the average imports and unloads of domestic-grown produce over this five-year period. As a consequence, any attempt to extrapolate this measure of the commercial market to another period would have to take into account changes in population and other factors related to the demand for fresh vegetables. Estimates of the commercial markets are given in Appendices I and II. A description of the method used to estimate these markets is also included in the Appendices.

^{1/} The six cities in Western Canada for which unload data is available, are as follows: Winnipeg, Regina, Saskatoon, Calgary, Edmonton and Vancouver. This information is recorded in the Annual Unload Report Fresh Fruit and Vegetables on 12 Canadian Markets, Canada Department of Agriculture Marketing Service, Markets Information Section, Ottawa. Data pertaining to the imports of fresh vegetables were obtained from the Dominion Bureau of Statistics.

CHAPTER I

THE DEMAND FOR EIGHT FRESH VEGETABLES IN WESTERN CANADA

Western Canada is a very large geographic area. Within this area numerous local markets exist in which prices move in the same general direction. The individual markets, nevertheless, reflect local differences in price arising from variations in transportation and distribution costs. Not only are there numerous local markets in Western Canada, but within them many different grades, and packages of different origins, of each type of vegetable are offered for sale. In each local market price relationships among these may differ from that at other markets.

Total consumption may be thought of as being made up of three distinct parts: 1) self supplies; 2) quantities that are marketed but do not pass through commercial markets; 3) those quantities which do pass through the commercial markets. Self supplies, of course, consist of vegetables grown in family gardens. The quantities marketed that do not pass through the commercial market are direct sales of vegetables by the producer to the consumer or those handled by peddlers who obtain their supplies directly from the producer, and not from a wholesale firm or a licensed vegetable dealer. Self supplies plus the quantity of produce marketed but not through commercial channels, shall be referred to as non-commercial supplies. The quantities of vegetables purchased by wholesale firms and licensed vegetable dealers are, of course, referred to as the commercial market and it is this part of the total consumption from the commercial producer's point of view that is a measure of the size of the total market for his product.

The population which consumes vegetables may also be considered in three sectors: 1) urban; 2) rural non-farm; and 3) farm.^{1/} Each sector of the population has a somewhat different pattern of consumption. In addition, each sector of the population relies upon certain channels of supply to satisfy its consumption requirements, and the predominant channel of supply is not only peculiar to the sector of population in question, but also peculiar to the commodity. To illustrate this point, let us consider the commodities potatoes and celery. Those familiar with the general agricultural structure in Western Canada are aware that the majority of farm families have a garden and the "potato patch" is usually the main component of their garden. No doubt many a farm boy has lamented over the task of filling the family cellar with potatoes in the fall only to carry out and

^{1/} The urban population is defined as the number of people who reside in centers of one thousand or more. Rural non-farm is the number of people who do not reside on farms but live in centers of less than one thousand. Farm population is the number of people who reside on farms.

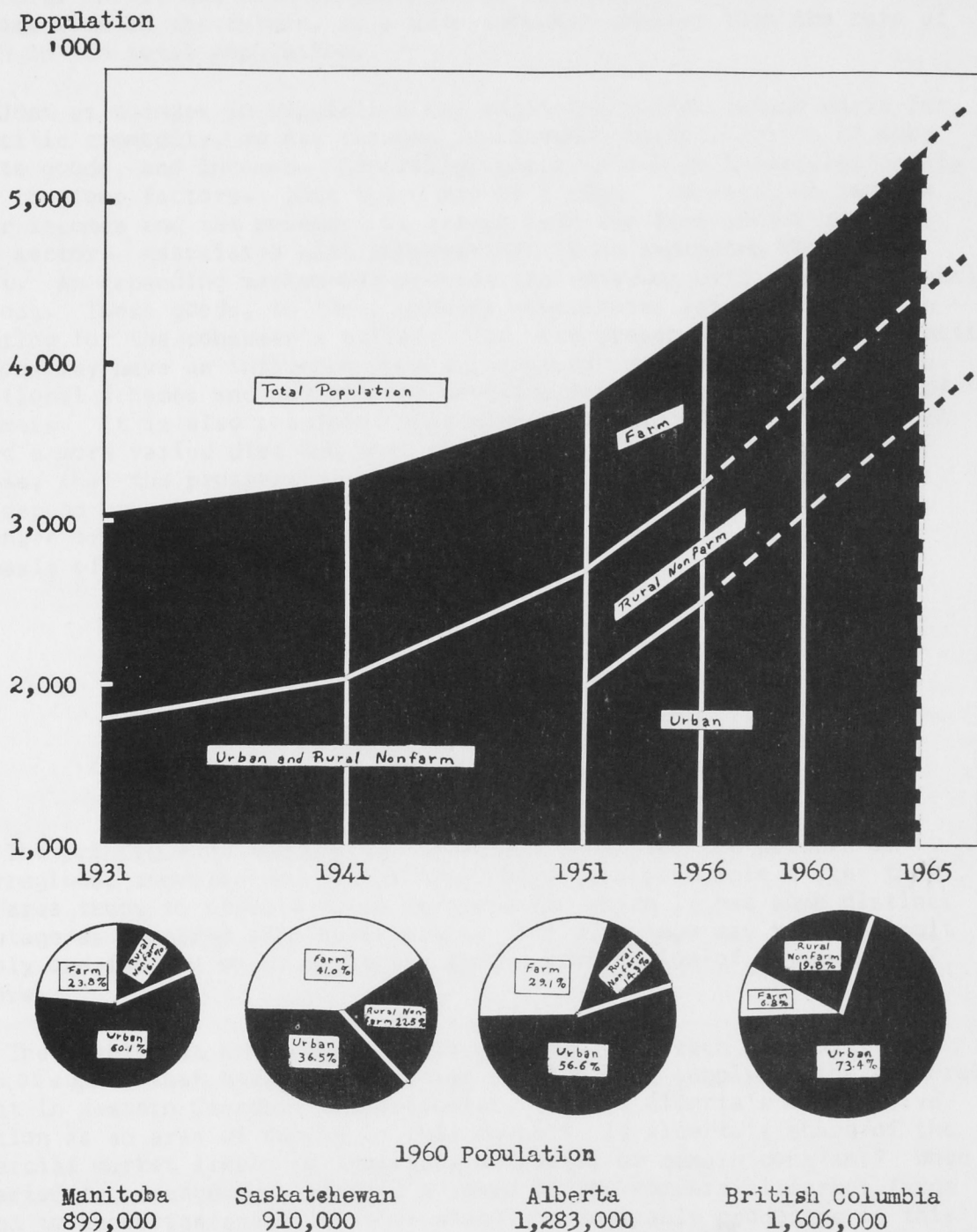
dispose of the unused and somewhat deteriorated portion the following spring. It may be assumed, that for a commodity that is easily stored such as potatoes, the farm sector of the population relies almost exclusively upon non-commercial supplies to satisfy its potato requirements. The situation is much different in the case of the urban sector of the population. In general, urban dwellers have neither the land area for the production of potatoes nor do they provide the necessary storage facilities. The common practice of urban dwellers is to satisfy their potato requirements by the purchase of small quantities from their local stores as the need arises. Urban dwellers do, of course, obtain some of their supplies of potatoes from non-commercial sources, either in the form of self-supplies, or by purchases made directly from the producer or from a peddler. In general, however, the urban population satisfies its potato requirements through the commercial market. The rural non-farm sector of the population is probably dependent upon both non-commercial supplies and commercial supplies to satisfy its potato requirements; the availability, quality, and price of non-commercial supplies are probably the governing factors. Celery, on the other hand, is a more difficult commodity to grow and to store than potatoes. Celery is not commonly grown in either farm or city family gardens, and, in the main, all three sectors of the population satisfy their celery requirements through the commercial market.

It is obvious no doubt, that changes in the commercial market depend in part upon changes in the population. To be more precise, growth in the commercial market, other things remaining the same, depends upon: 1) growth in the total population, and 2) an increase in the urban population relative to the total population. Growth in the total population that is uniform in all sectors naturally means a larger total consumption and a larger commercial market, since there are that many more mouths to feed. If growth occurs in the urban sector at a more rapid rate than in other sectors of the population it follows that the commercial market will grow at a faster rate than the total population. This is so, because as people shift from the farm and rural non-farm sectors into the urban sector they become more dependent upon the commercial market.

Such changes in population have been taking place in Western Canada during the past 30 years. In Figure 1, growth in the total population and changes in the proportions of the three sectors are shown plotted on a arithmetic scale. In the main diagram the dark lines represent the population at different periods in time as reported by the Dominion Bureau of Statistics. The dotted lines are projections of the population; from the period 1951 through 1960 in the case of the total population, and 1951 through 1956 in the case of the populations contained in the three sectors; farm, rural non-farm and urban. The urban and rural non-farm sectors were not defined by the Dominion Bureau of Statistics until 1951, so prior to that year we have no separate measures of the two sectors. The pie graphs at the bottom indicate the size of the population in each of the western provinces with the percentages of the sectors based on the 1956 Canada Census.

This rapid growth in total population especially since 1951, and the rapid shift to urbanization beginning as early as 1941 has undoubtedly had a tremendous impact upon the size of the commercial market. Unfortunately

Figure 1.- Farm, Rural Nonfarm, and Urban Population in Western Canada, 1931 to 1960 and Estimated to 1965.



Source: The population is estimated from the 1956 Canada Census and the Intercensal Estimates as published by the Dominion Bureau of Statistics. The percentages in the pie graphs are based upon the 1956 census.

data are not available for a sufficiently long period to measure the effect of this. But, relying on our knowledge of the dependence of different sectors of the population upon the commercial market we know that the commercial market has been expanding, and probably will continue to expand for some time in the future, at a rate somewhat greater than the rate of growth in the total population.

Just as changes in population may shift the market demand curve for a specific commodity, so may changes in consumer tastes, prices of substitute goods, and incomes. Generally, there is a high interrelationship among the four factors. Thus there may be a high correlation between higher incomes and the movement of people from the farm sector to the urban sector. Associated with urbanization is an expanding commercial market. An expanding market may provide the consumer with a wider selection of goods. These goods, in turn, provide substitutes for one another in competing for the consumer's dollar. The very presence of a large selection of goods may have an influence upon a change of tastes among consumers. Promotional schemes and educational programs may influence the tastes of consumers. It is also possible, that with higher incomes, consumers can afford a more varied diet and they may indulge in "luxury" goods. It follows, that the prosperity of any group of producers in a given area will depend upon the share of the market that they are able to capture. The share of the market that any area of supply holds is determined on the basis of comparative advantage.

CHAPTER II

INTERREGIONAL COMPETITION IN SUPPLY

The principle of comparative advantage underlies the pattern of interregional competition. In general terms this principle states that each area tends to produce those products for which it has some distinct advantage as compared with other areas. The advantage may be the result of only one factor, or it may arise from a combination of any number of factors.

The problem at hand, then, is to determine for each commodity the areas of supply that have a comparative advantage in supplying the commercial market in Western Canada. In particular, what is Alberta's competitive position as an area of supply in this market? Is Alberta's share of the commercial market likely to increase, decrease, or remain constant? When converted to acreages, is Alberta's share of the commercial market large enough to encourage specialization among the vegetable producers in this province?

These questions can be answered at least partially by determining which areas of supply have a dominant share of the commercial market in Western Canada during different seasons. However, before doing so, some of the factors that give one area of supply an advantage over another should be mentioned.

For the present it is convenient to divide the cost of supplying a market into the costs of production and the costs of distribution. In this division it will be noted that the costs of production are closely related to the growth requirements of the vegetable, and that in turn these are related to the environmental factors of the different areas of supply. On the other hand, costs of distribution are closely related to the physical characteristics of the vegetable such as its handling qualities and its perishability. The factors that make up the costs of production and distribution are elaborated on in the following, but first it is convenient to obtain a perspective of Western Canada in relation to the areas of supply.

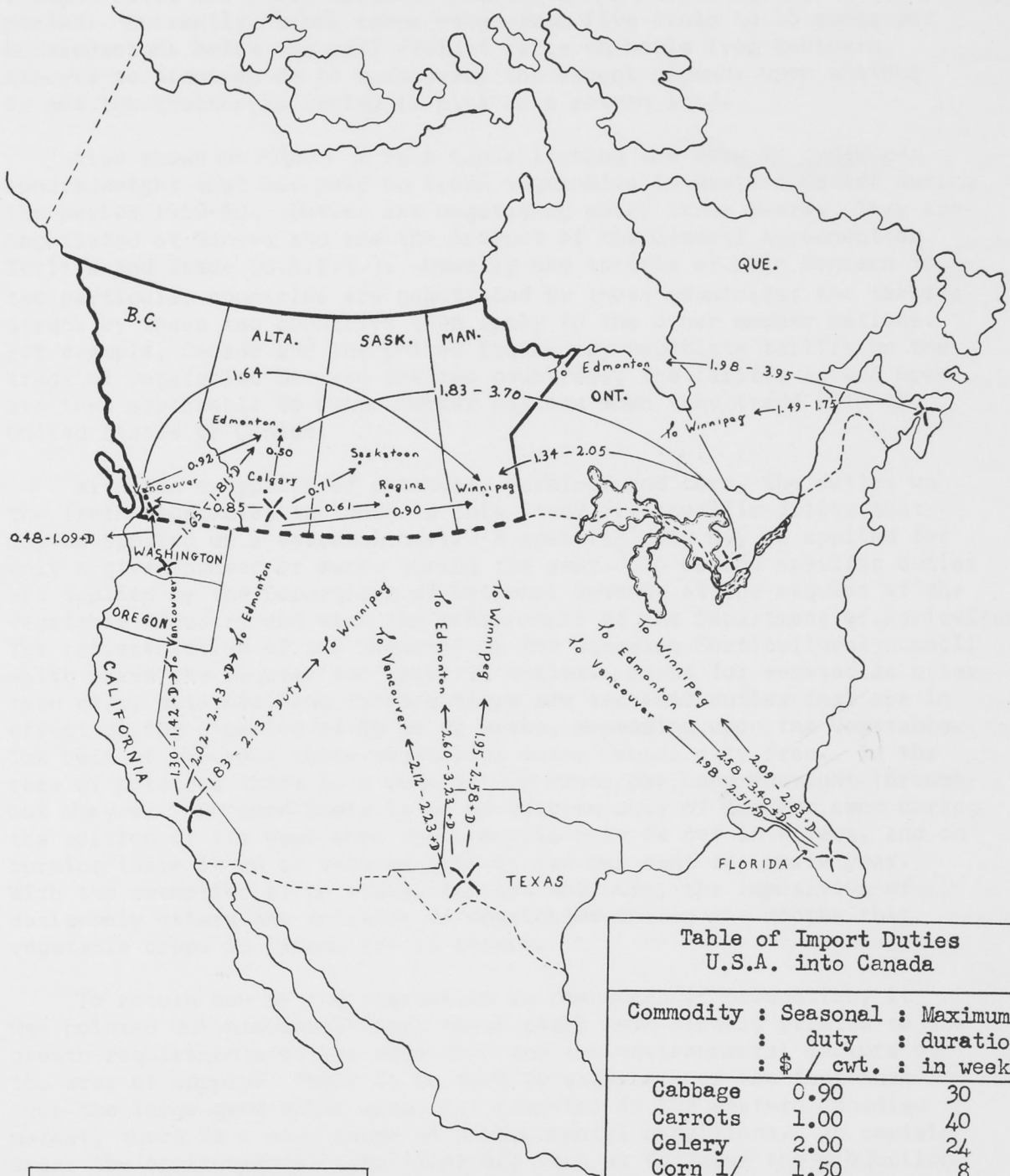
The market area of Western Canada is delineated by heavy black lines. Each of the western provinces, of course, can be considered as areas of supply since each province to some extent supplies its own markets and in addition may supply neighboring provinces with certain vegetables. The only other province that supplies an appreciable amount of fresh vegetables to Western Canada is Ontario. The Maritimes have, on occasion, supplied Western Canada with very small quantities of potatoes and turnips. Of the vegetables imported into Western Canada, the States of California, Washington, Oregon, Texas and Florida, are the major areas of supply. It is interesting to note that all of these states border along the sea coast. The States of California, Texas, and Florida lie in part between 30° and 40° latitude and have climates which permit three crops to be grown on the same land each year. This is compared to one field crop per year in Western Canada. (Figure 2)

Included in Figure 2 are the costs of transporting the commodity by rail from the various areas of supply to specific points in Western Canada. The rates shown are general rate levels for the year 1959. A range is shown in the cost of transportation because the rate is different for different classes of vegetables. This is partially due to the nature of the commodity. For vegetables such as corn, tomatoes and celery, that require special handling and refrigeration, the freight rates are higher than for vegetables such as potatoes and turnips. It is also interesting to note that tapering freight rates and competitive freight rates undoubtedly have an influence upon the movement of vegetables to, and within, Western Canada. For example, the freight rate from Vancouver to Winnipeg is lower than the aggregate rate from Vancouver to Southern Alberta plus the rate from Southern Alberta to Winnipeg. One example of the effect of competition (although not important in this case) is the difference in the rates between Florida and Winnipeg, and Florida and Vancouver. The latter is the lower rate because the railroads are said to compete with ships via the Panama Canal.

During the relatively short period of five years, 1955 through 1959, it is estimated that of the total volume of fruits and vegetables unloaded in Western Canada, the volume unloaded by trucks has increased from 37.2 per cent in 1955 to 52.9 per cent in 1959.^{1/}

^{1/} Estimates calculated, from Annual Unload Reports. In 1955, 61.1 per cent of the domestic-grown fruit and vegetables were moved by truck in Western Canada; 37.2 per cent of the imported fruit and vegetables were moved by truck. In 1959, 73.3 per cent of the domestic-grown fruit and vegetables were moved by truck in Western Canada and 52.9 per cent of the imports were moved by truck.

Figure 2.- Areas of Supply for Fresh Vegetables to Western Canada, Transportation Costs, and Import Duties, 1959 - 1960.



Relative Cost of Shipping i.e. (\$1.83 - \$3.40/cwt.)		
Celery	Highest	
Corn		
Tomatoes		
Potatoes	Lowest	

Table of Import Duties U.S.A. into Canada		
Commodity	Seasonal : duty : \$ / cwt.	Maximum : duration : in weeks
Cabbage	0.90	30
Carrots	1.00	40
Celery	2.00	24
Corn <u>1/</u>	1.50	8
Onions <u>2/</u>	1.50	44
Potatoes	0.37½	52
Tomatoes	1.50	32
Turnips	10% ad valorem	52

Based on rates effective April 10, 1959 to March 31, 1960.
1/ Corn on the cob. 2/ Excludes onion sets and shallots.

Figure 2. Areas of Supply for Fresh Vegetables to Eastern Canada, Transportation Costs, and Market Output, 1977 - 1980



Table 1. Areas of Supply for Fresh Vegetables to Eastern Canada, Transportation Costs, and Market Output, 1977 - 1980

Province	Area of Supply (km ²)	Transportation Costs (\$ million)	Market Output (kg)
Ontario	1,200	1.2	1,200,000
Quebec	1,500	1.5	1,500,000
Atlantic	1,000	1.0	1,000,000
Total	3,700	3.7	3,700,000

Table 2. Relative Costs of Transporting Fresh Vegetables to Eastern Canada, 1977 - 1980

Province	Relative Costs (1977 - 1980)
Ontario	1.0
Quebec	1.2
Atlantic	1.5
Total	1.2

The influence of truck competition upon the railroads has forced freight rates for a few specific commodities downward during this period. Currently, truck rates range from five cents to 15 cents per hundredweight below the rail freight rates on hauls from Southern Alberta to Winnipeg or to Vancouver, the amount depends upon whether or not the trucker is trying to pick up a return load.

Also shown in Figure 2 is a table listing the duty in cents per hundredweight that was paid on fresh vegetables in Western Canada during the period 1959-60. Duties are negotiated every three years. They are negotiated at Geneva and are the product of the General Agreement on Tariffs and Trade (G.A.T.T.). Usually the tariffs of main concern to two particular countries are negotiated by those countries; the tariffs struck by these two countries then apply to the other member nations. For example, Canada and the United States may negotiate tariffs on the trade of vegetables between the two countries, the tariffs agreed upon are then applicable to other member nations when they trade with the United States or Canada.

With the exception of potatoes, turnips, and corn, the duties on the fresh vegetables included in this study are specific duties that may be applied on a seasonal basis. A specific duty may be applied for only a given number of weeks during the year. In Canada specific duties are applied by the Department of National Revenue at the request of the vegetable industry and with the concurrence of the Department of Agriculture. The representative of the industry is the Canadian Horticultural Council which makes the request for specific duties. Hence for vegetables other than corn, potatoes, and turnips there are seasonal duties that are in effect during a period of 26 to 40 weeks, depending upon the vegetable. The rest of the year these vegetables enter Canada duty free. In the case of potatoes there is a duty of $37\frac{1}{2}$ cents per hundredweight throughout the year. On corn there is an ad valorem duty of ten per cent during the portion of the year when the specific duty is not in effect, and on turnips there is an ad valorem duty of ten per cent the whole year. With the exception of potatoes, turnips and corn, the imposition of duties only deters the entrance of vegetables during the months that vegetable crops in Canada are in season.

To return now to the discussion on the costs of production, it was pointed out previously that these costs were closely related to the growth requirements of the vegetable and the environmental factors of the area of supply. There is no need to elaborate on the fact that over the large geographic area that competes in the Western Canadian market, there is a wide range of environmental conditions. In certain areas the environmental conditions are such as to favor the production of certain commodities. But the yield per acre is only one part that affects the costs of production. Different vegetables require different quantities of inputs. To grow tomatoes an intensive use of labor is required. This is also true of celery. The plants of these vegetables

are usually started in greenhouses, hotbeds, coldframes, or open-field plant beds.^{1/} If they are started in greenhouses or hotbeds the seedlings are transplanted once into cold frames and finally transplanted into the field. During the growing period they require attention that for the most part can only be performed by hand labor. During the harvest season these plants again require intensive use of labor, especially in the case of tomatoes in which the field may be picked through several times before the plants are destroyed. Thus, the availability of labor may give one area of supply an advantage over another in the production of labor intensive crops. ^{2/} In contrast the production of crops such as potatoes usually requires relative extensive use of land, extensive use of specialized equipment, and a relatively small proportion of the total cost in the form of labor.

The costs of production are derived from the cost of land, labor and capital. In turn the cost of each factor of production is determined by the supply and demand for that factor. If the production in a specific area takes place on a large scale internal economies and external diseconomies must be reckoned with. The costs of production per unit of produce in any one area are not relative just to the physical productivity of the area, but are also relative to the general level of farm prices and farm wages in that area in the given period of time.

Once the commodity has been produced there remain the additional costs of distributing it to the final users. As previously mentioned, distribution costs are dependent upon the physical characteristics of the vegetables and upon the proximity of the area of supply to the specific market. However, there is more to distribution than merely transferring a commodity over a geographic area from point A to point B. The commodity also may be transferred through time. Hence when a commodity is transferred over a geographic area costs of transportation are involved, and when it is transferred through time costs of storage are involved.

If a commodity is of a type that can be stored from one crop season to the next without excessive deterioration at a cost below that of bringing it in from more distant areas, the supply of that commodity will normally come from the area closest to the market. In other words,

^{1/} According to W.S. Porte, most of the commercial tomato crop (fresh trade and cannery) in the United States is grown from seedlings started in hotbeds and coldframes or from seedlings started in open-field beds in the South, from which the seedlings are shipped to the major producing areas in the North. See: Commercial Production of Tomatoes, Farmers Bulletin No. 2045 United States Department of Agriculture, Washington.

^{2/} In the Western United States as far north as Oregon, Idaho and parts of Washington, migrant labor force composed of Mexicans and Spanish speaking nationals from Texas and Minnesota are an important part of the vegetable industry. It is also estimated that 25,000 migrants, mostly southern Negroes, annually enter the state of New York to harvest and process crops. See: The Packer National Weekly Newspaper Chicago edition September 8, 1961 and April 13, 1962 issues.

the storage characteristics of a vegetable determine to a large extent whether or not the annual supply to a market originates locally. For example, potatoes may be stored six months or more without excessive deterioration. The storage characteristics combined with growing characteristics of this vegetable enable local potato growers in Western Canada to maintain a comparative advantage for at least ten months of the year. On the other hand cabbages, although suitable for the climatic conditions of Western Canada and consequently relatively easy to produce, are extremely difficult to store beyond a period of four months without excessive deterioration. As a result, local producers of cabbage in Western Canada maintain a comparative advantage in supplying the market for only two to four months more than the period in which cabbages are in season.

Two more types of costs must be considered under the general heading of costs of distribution: they are costs of merchandising and costs of advertising.^{1/} In the case of both of these costs the preferences of consumers must be reckoned with. The costs of merchandising may be viewed as adding value to the commodity, but in doing so the commodity is broken down into a number of slightly differentiated products. Thus, washed potatoes may sell in greater volumes through retail stores than unwashed potatoes, even though the latter may have a slight price advantage to the consumer. Similarly, carrots that have been graded, washed, and packaged into attractive polyethylene bags may sell in far greater volumes and at higher prices than bunched carrots. By the same token, brand names and advertisements are used to differentiate the products of one area or agent from those of another. The consumer is conditioned to associating quality in vegetables with a particular name, color, or shape of the package.

Advertising and merchandising may affect comparative advantages when the final products are differentiated according to the area of supply. Often wholesale firms may process and pack a vegetable under a brand name without mentioning the place or origin of the vegetable. In this case, it has been argued that wholesalers make their purchases of a commodity strictly on the basis of price competition, regardless of the origin of the commodity. The area that has the comparative advantage in supply then will benefit. An example in which advertising and merchandising increase the sales of a commodity from a specific area of supply, independent of the area's advantage in cost, is the national advertising campaign carried on by the Idaho Potato and Onion Commission in promoting the sales of Idaho potatoes. In Canada the British Columbia Tree Fruit Growers' Association carries on a similar campaign.

^{1/} While one may consider these costs to occur after the wholesale firms purchase the commodity, nevertheless these costs have a bearing upon the quantity sold in the retail market. Since the wholesales' demand for the commodity is "derived" from the consumers' demand for the commodity, the costs of merchandising and advertising have a direct bearing upon the quantities purchased by the wholesales. For an excellent text on theoretical methods of evaluating the efficiency of the "middleman" see William H. Nicholls' Imperfect Competition within the Agricultural Industries, Ames, 1947.

The problems involved in assessing the comparative advantage of different areas of supply relative to one market should now be obvious. It is a complex chain of marketing that puts fresh vegetables into retail stores. To assess the comparative advantage of different areas of supply the costs of production and the costs of distribution for each area would have to be calculated and compared. Since it is known that costs of supply from different areas vary according to the season, adjustments or recalculations would have to be performed to account for seasonality. Too, the costs of production and of distribution are in themselves comprised of factor costs as determined by the supply and demand for the factors, hence an assumption would have to be made that factor costs maintain the same relationships over the period in which the costs are established. It would also be necessary to assume that no changes in technology occur during the period in which costs are observed. Finally, since the comparative advantage of different areas supplying a specific market is far different for each commodity, each commodity would have to be considered separately, or the commodities would have to be grouped according to common physical characteristics of growth and storage.

For these reasons no attempt is made in this study to assess the comparative advantage of different areas of supply on the basis of costs of production or costs of distribution. Rather, the approach used here is one which determines which areas of supply have comparative advantage as revealed by their respective shares in the market. It is assumed that the area of supply that holds the dominant share of the market during any particular season must do so because it can supply the market at the lowest cost.

In the following chapter the shares held by the different areas of supply to the western provinces have been ascertained for each of the eight commodities. From these shares the comparative advantage of Alberta as an area of supply to the four western provinces is discussed in relation to the other areas of supply.

CHAPTER III

THE COMPETITIVE POSITION OF ALBERTA GROWERS IN WESTERN CANADA

In the previous chapter it was pointed out that the comparative advantages of different areas of supply relative to a specific market were determined on the basis of lowest costs. These costs, it was stated, can be classified as costs of production and costs of distribution. One of the factors that influences the costs of production is the growth characteristics of the vegetable: one of the factors that influences the costs of distribution is the storability of the vegetable. The appropriate starting point, then, in assessing the comparative advantage of Alberta as an area of supply to the Western Canadian market is to consider the physical characteristics of the vegetables.

Accordingly, the fresh vegetables in question have been divided into three groups. These groups are as follows:

Group I, Vegetables that are well adapted to the climate of Western Canada and capable of being stored from the end of one crop season until the beginning of the next. Included in this group are potatoes and turnips.

Group II, Vegetables that are moderately well adapted to the climatic conditions in Western Canada, but are difficult to store. Included in this group are corn, cabbages, carrots and onions.

Group III, Vegetables that are relatively costly to produce on a commercial scale in Western Canada and which are difficult to store. Included in this group are celery and tomatoes.

The quantity of produce that is sold by any one area of supply depends upon the size of the total market that is available and upon the share of that market which is held by the particular area of supply. Thus, the quantity of a certain commodity sold by a specific area of supply may increase over time as a result of a larger share of the market being obtained by the specified area, or the quantity that it sells may increase because it maintains its share of the available market but the market itself expands. The number of combinations that are possible between the size of the available market and the share of that market held by a specific area of supply are almost infinite. The market situation as it exists for each of the above groups now will be discussed in turn.

Group I.- The vegetables included in this group are potatoes and

turnips. These vegetable are well adapted to the environmental conditions in nearly all parts of Western Canada. They are commonly grown as field vegetables. Little difficulty is encountered in growing them on a commercial scale.

In Alberta the annual commercial acreage of potatoes for the five-year period 1955 through 1959 has been estimated at 9,400 acres.^{1/} During the nine-year period 1951 through 1959 the commercial acreage of potatoes in Alberta has increased from 7,473 acres to 11,676 acres. Approximately two-thirds of this acreage is located in the irrigation districts. During the same period, the number of commercial growers has decreased from 771 in 1951 to only 442 in 1959. This is an indication of the growth and the specialization that has occurred within the potato industry in Alberta during the last decade. While the capital requirements to start production on a small scale are not high, many of the growers within the Province have specialized to the extent that they have from five to 30 thousand dollars in seeding and harvesting equipment, plus an additional five to 50 thousand dollars in the form of root cellars, washing plants and grading equipment.^{2/}

The commercial production of turnips in Western Canada is of much less importance. In Alberta the annual commercial acreage for the five-year period was estimated at approximately 400 acres, over half of which was in irrigation projects.^{3/} As far as can be ascertained the production of turnips within Alberta has remained as a secondary enterprise on farms specialized in vegetable production.

The relationships between the harvesting and storage seasons of these vegetables and wholesale prices are shown in Figures 3 and 4. In these figures, the graphs represent the wholesale price of domestic-grown produce sold in the western provinces. The prices used in the construction of the graphs represent an average of all grades and kinds of vegetables, respectively. The prices are based on a five-year average, July 1955 through June 1960.^{4/} The length of the bar chart below the graph shows the approximate period of time that produce grown in Western Canada goes "on" to the market. The shaded area represents the period in which the vegetable is harvested in Western Canada, and the striped area shows the length of time the vegetable is stored for purposes of sale in the commercial market.

- ^{1/} Commercial acreages estimated from the Annual Report of the Department of Agriculture of the Province of Alberta, Queen's Printer, Edmonton.
- ^{2/} These estimates have been made by the author, and they are based upon personal observations of and talks with potato growers within Alberta.
- ^{3/} The turnip acreage is based upon estimates reported in the Fruit, Vegetable and Honey Crop and Market Report, Canada Department of Agriculture, Ottawa, and upon estimates made by the Provincial and Federal personnel who are serving the vegetable industry in Alberta.
- ^{4/} Prices calculated from Crop and Seasonal Price Summaries, Canada Department of Agriculture, Ottawa.

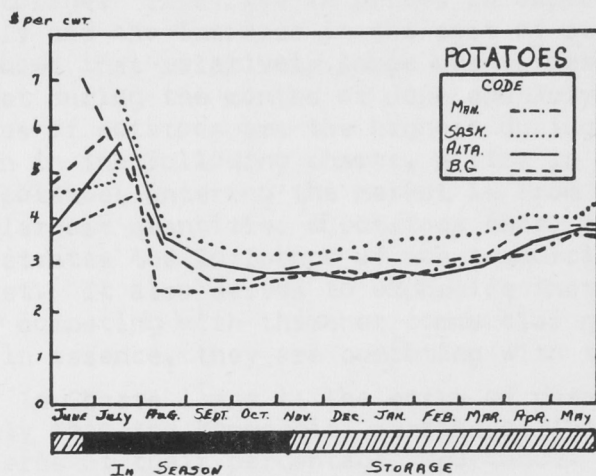


Figure 3.- Prices of Domestic-grown Potatoes at Wholesales in Western Canada, July 1955 through June 1960.

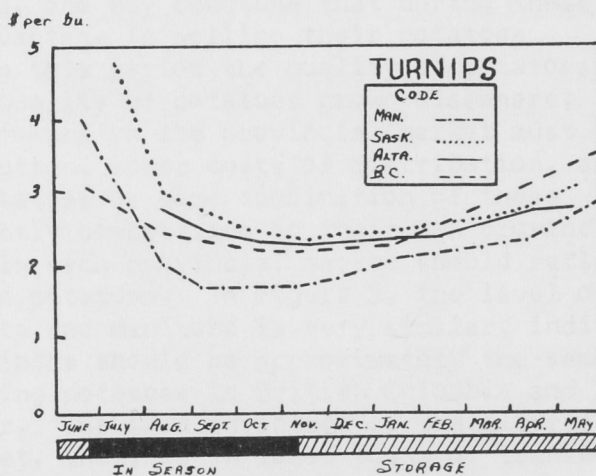


Figure 4.- Prices of Domestic-grown Turnips at Wholesales in Western Canada, July 1955 through June 1960.

Seasonal trends in prices are common to both vegetables. At the beginning of the harvest season the prices are exceptionally high. As the season advances the supplies increase and the prices decrease. Once the supplies go into storage there is a gradual rise in prices until the end of storage. This rise in prices is explainable in part by a decrease in supply and the increase in the cost of storage over time. Table A-6, Appendix I, shows that relatively large quantities of potatoes enter the commercial market during the months of June and July. This is a period in which the prices of potatoes are the highest during the course of the year, and as shown in the following charts, a time in which the largest proportion of the potatoes entering the market is from the United States. The fact that the largest quantities of potatoes enter the commercial market "out of season" illustrates the influence of non-commercial supplies upon the commercial market. It also serves to emphasize that "in season" local growers are not only competing with the other commercial growers for the consumer's dollar, but in essence, they are competing with the numerous family gardens as well.

In Charts 1 and 1A the entry of potatoes from the different areas of supply into the commercial markets of the four Western Provinces is shown in terms of their percentage importance. The percentages are based upon the total quantities that have been observed to enter the commercial market each month at the existing wholesale prices during the five-year period July 1, 1955 to June 30, 1960.^{1/} The charts, therefore, indicate the share of the commercial market in each of the four Western Provinces that was held by the different areas of supply during the given time period. From this, we may also deduce that during any one month the area of supply that held the largest share of a market must in that particular month have held the comparative advantage in supplying that market.

From Chart 1, it is obvious that during the months August through May the Alberta potato growers almost completely dominate the commercial market within the Province. From this, one may conclude that during these months the local producers have an advantage in selling their potatoes in the Alberta market area. If during this period the quality of potatoes grown in Alberta does not excell the quality of potatoes grown elsewhere, the advantage of the Alberta potato growers in the provincial market must be the result of lower costs of production, lower costs of distribution, an established preference for Alberta potatoes or some combination of these three. If potato producers are perfectly competitive in their own provincial markets, then the prices of potatoes in each provincial market should reflect the costs of production of local grown potatoes. In Figure 3, the level of wholesale prices of potatoes in Alberta and Manitoba is very similar, indicating that production costs in the two provinces should be approximately the same. By the same token, the cost of producing potatoes in British Columbia and in Saskatchewan should be slightly higher. The main advantage of the Alberta growers in supplying the Alberta market, then, is in lower costs of transporting their produce to the market.

The corollary, of course, is that local markets are most easily captured by the local producers, who, in effect, have a locational advantage when transportation costs are considerable, as they are for potatoes. This supposition is substantiated by Charts 1 and 1A in which it is shown that during the period August through April

^{1/} From Annual Unload Reports.

over 60 per cent of the potatoes that entered the commercial markets in British Columbia, Alberta and Manitoba, originated from areas within the respective provinces. The one exception is the Province of Saskatchewan and this case is elaborated upon below.

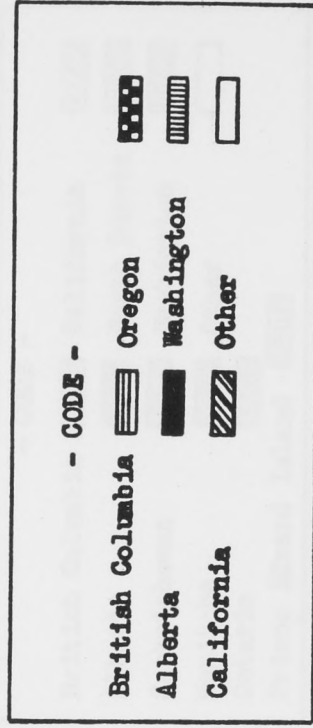
From Chart 1 it is seen that during the period August through April over 95 per cent of the supplies entering the commercial market in Alberta originates from within the Province. This means that during the given period Alberta producers cannot expect to increase the quantity of potatoes they sell in Alberta to any great extent by obtaining a larger share of the Alberta market. Instead, they must rely on an increase that will occur in the size of the commercial market in the Province, chiefly as a result of a growth in the population and a greater degree of urbanization. Accordingly, for Alberta growers to increase their sales of potatoes in the near future by any substantial amount they must increase their share of the other provincial markets.^{1/}

Of the three other Western provinces, British Columbia has the most attractive market to invade. In terms of quantity the size of the commercial market for potatoes in British Columbia is relatively large, approximately 163 million pounds annually and approximately 122 million pounds during the period August through April, see Table A-6, Appendix I. As illustrated in Chart 1, Alberta supplies less than five per cent of the commercial market in British Columbia during the period August through April. Local growers in British Columbia have retained about 60 per cent of the market. If this continues it means that 40 per cent will be supplied from other areas. The competition that Alberta could most easily replace are those supplies originating in the United States, particularly from Washington and Oregon. On the basis of costs of delivery, Washington can place potatoes into Vancouver for approximately 85-1/2 cents per hundredweight (48 cents transportation costs plus 37-1/2 cents per hundredweight import duty. See Figure 7).^{2/} From shipping points in Southern Alberta potatoes can be moved to Vancouver for approximately 85 cents per hundredweight. On the basis of costs of delivery there appears to be no definite advantage accruing to Alberta over Washington, and the comparative advantage of these two areas in supplying the British Columbia market is determined by other factors. On the other hand, it would appear that Alberta has a definite advantage in cost of delivery over areas of supply such as Oregon or California.

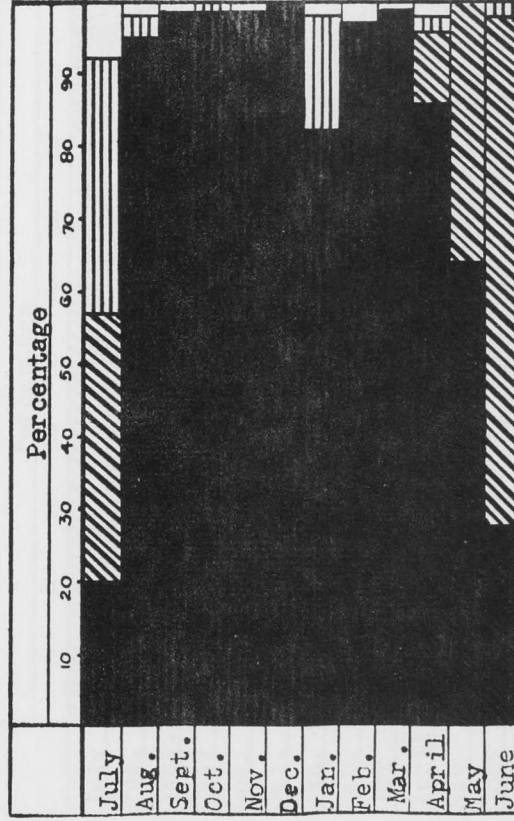
^{1/} It seems extremely unlikely that in the near future Alberta grown fresh vegetables will be exported in any large quantities into the United States. Aside from import duties and restrictions placed upon the entry of fresh fruits and vegetables into the United States distance of large urban centers from the supply areas of Alberta makes such a movement unlikely. Of the larger centers which are relatively close to Alberta, one may cite Seattle, or Salt Lake City. Obviously, there are areas of supply within the United States that are capable of supplying these centers with vegetables at a lower cost.

^{2/} The transportation rates quoted above and in Figure 7, are only general indications of the train and truck rates.

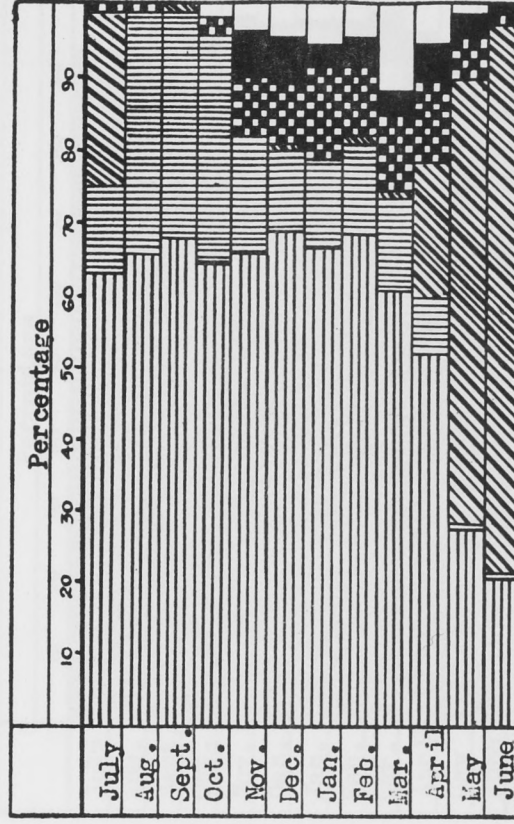
Chart 1.- The percentage of Potatoes from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



ALBERTA

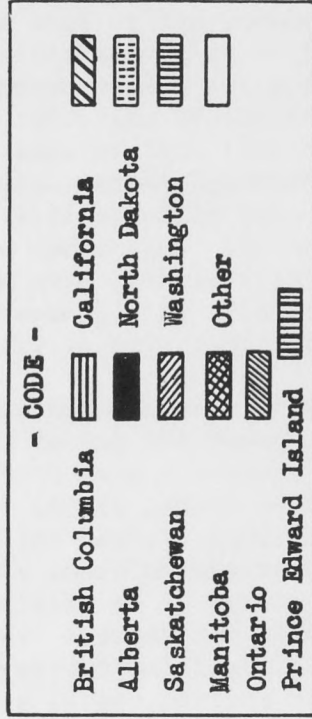


BRITISH COLUMBIA

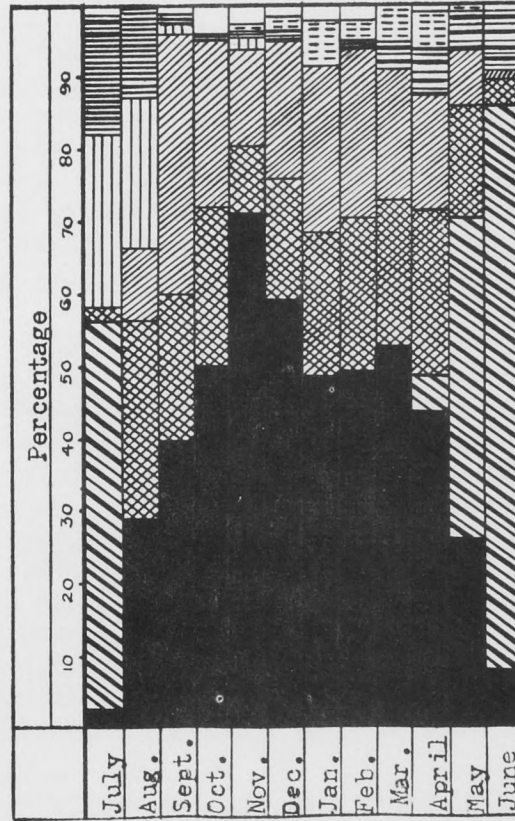


POTATOES

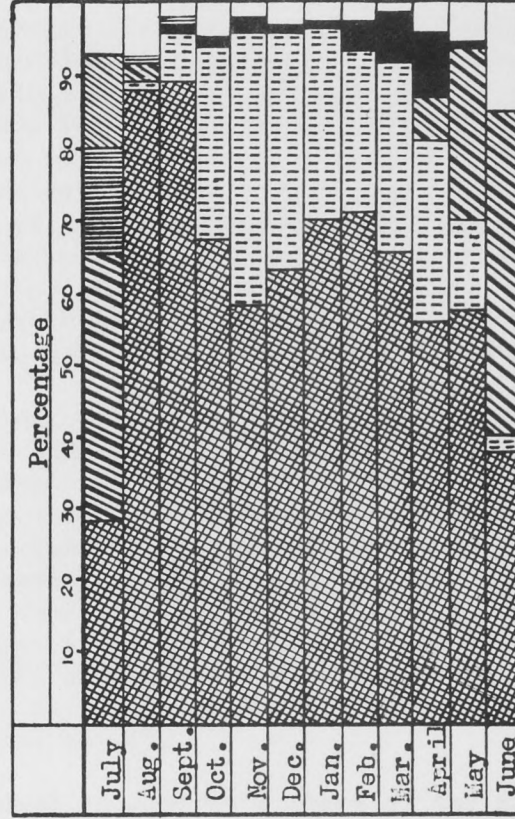
Chart 1A.- The percentage of Potatoes from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



SASKATCHEWAN



MANITOBA



POTATOES

The size of the commercial market for potatoes in Saskatchewan is much smaller than that of British Columbia. The size of the annual Saskatchewan market was approximately 39 million pounds for the period 1955 to 1960, and 29 million pounds for the months August through April for the same period. For the same months, Alberta's share of the Saskatchewan market has been approximately 45 per cent. Whether or not Alberta will maintain this share of the Saskatchewan market in the future is quite uncertain. In the latter part of the 1950's local growers were becoming more prominent in supplying the commercial market in Saskatchewan.^{1/} If this trend continues Alberta may experience some difficulty in maintaining its present share of the Saskatchewan market.

Alberta's share of the Manitoba market is less than five per cent. Clearly, during the months August through April Manitoba and North Dakota both have a comparative advantage in supplying the provincial market. (North Dakota delivers potatoes to Winnipeg at approximately five to ten cents a hundredweight below Alberta). In the near future Alberta's share of the Manitoba market is not likely to increase. This is especially so if Saskatchewan obtains more of its potatoes from local supplies. A situation of this sort would have repercussions in the Manitoba market which would possibly give rise to Manitoba producers storing a larger portion of their potato crop and thereby increasing their own share of their provincial market.

So far no mention has been made of Alberta's share of the provincial markets during the months May, June and July. Turning once again to Chart 1 it is evident that during these three months California has the dominant share of the Alberta market. During this period the supplies that enter the Alberta market from California and British Columbia are new potatoes, which from the consumer's point of view is undoubtedly a superior product as compared to the somewhat deteriorated potato from the storage supplies of local grown potatoes. Even though new potatoes sell for a much higher price than potatoes from storage, the consumer preference is such that the comparative advantage in supplying the Alberta market shifts to California. Obviously if Alberta growers are unable to maintain the comparative advantage in supplying their local markets during these three months it can hardly be expected that the same growers could increase their share of the market in the other provinces.

It would appear then, in the case of potatoes that Alberta as an area of supply may increase its share of the British Columbia market and in the very near future maintain its share of the markets in the other three provinces. The incidence of disease or crop failure in any one area of supply can of course, shift the comparative advantage quite abruptly to other areas of supply. Thus, during the crop year 1960-61 a plant disease known as net necrosis became widespread among certain potato producing areas in Washington, with the result that a portion of those potatoes was diverted from the British Columbia market. This, of course, gave a somewhat temporary advantage to Alberta supplies in British Columbia. Of a more permanent nature will be the influence of growth in population and urbanization upon the size of the commercial market.

^{1/} K.I. Vick, A Study of Vegetable Production and Marketing in Saskatchewan, Canada Department of Agriculture, Economics Division, Ottawa.

Most of what has been said of potatoes can be said of turnips also. But in the case of turnips there is a slight difference. The fact that storage turnips move into Western Canada from Prince Edward Island suggests that production in Western Canada should be able to expand.

In the Alberta market, Chart 2, it is shown that during the months of April, May and June, approximately 38 per cent of the turnips entering Alberta's market originates in Prince Edward Island. However, when 38 per cent is expressed in terms of quantity it only represents approximately four carlots. Alberta producers, protected by the costs of transportation, could probably supply 90 per cent or more of the Alberta market throughout the year. On the basis of Charts 2 and 2A, it is suggested that Alberta could also increase its share of the turnip market in the other three provinces.

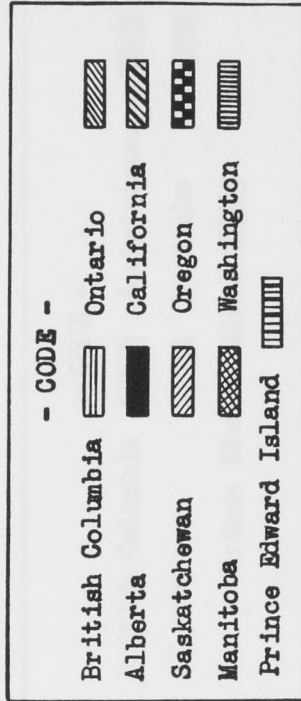
Group II.- Included in this group are corn, cabbages, carrots and onions. These vegetables are distinguished from those in Group I primarily on the basis of their storability, although they are more difficult to produce on a commercial scale than either potatoes or turnips. On a commercial scale corn and carrots are generally seeded directly into the field or "field planted". On the other hand, cabbages and onions may be grown from either "field plantings" or from transplants. Both of these methods are used to produce cabbages and onions in Western Canada. When these vegetables are sown directly into the field a saving of labor costs is made as well as in the costs involved in the operation of greenhouses and hotbeds. On the other hand, plants that are grown from transplants mature two to four weeks earlier than those seeded directly into the field.

Of the four vegetables included in this group, fresh corn is the most perishable. Under ideal conditions, given our present state of technology, corn cannot be maintained in the fresh state for more than 14 days. As a consequence, the entry of domestic fresh corn into the commercial market is very seasonal, the peak being in the months of August and September. On the other hand, onions are the least perishable of this group. Onions may be stored, without excessive deterioration, for approximately seven to eight months. Cabbages commence to deteriorate quite rapidly after two months and carrots after three months of storage. The deterioration of these two commodities is reflected in the wholesale prices as shown in Figures 6 and 7 respectively.

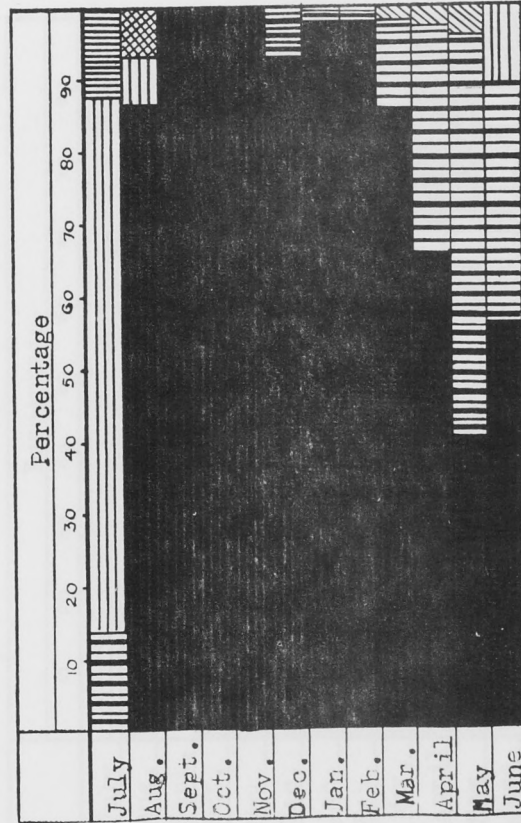
The supply of corn in Western Canada is what one would expect. The perishability of corn is such that special precautions must be taken when corn is transported for any distances requiring more than three or four hours of travelling time.^{1/} Such precautions add to the cost of

^{1/} When corn is shipped over long distances such as from California to Edmonton, the corn is precooled to 33° - 34°F. almost immediately after it has been picked. The corn is then packed in ice and shipped to the destination in refrigerated cars or trucks. When corn is shipped from Southern Alberta to Edmonton a common method is to pick the corn during the night when the air temperature is cool. The corn is then loosely packed in a truck and delivered before the heat of the day settles in.

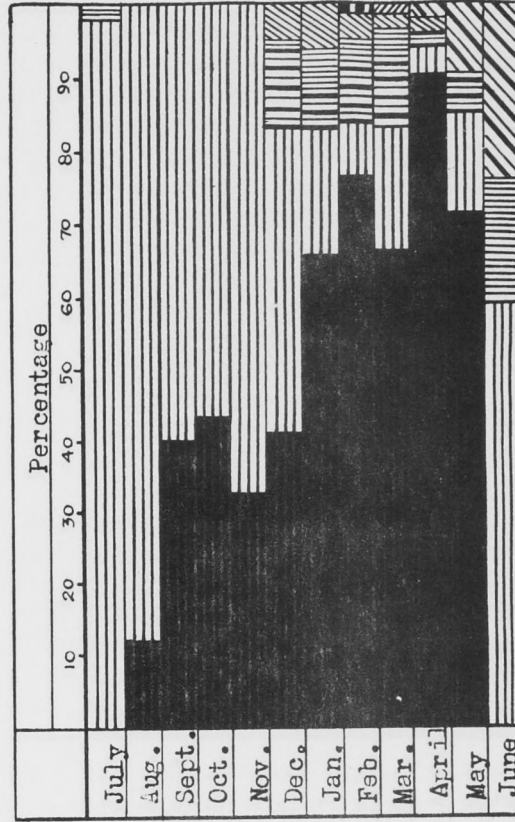
Chart 2.- The percentage of Turnips from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



ALBERTA

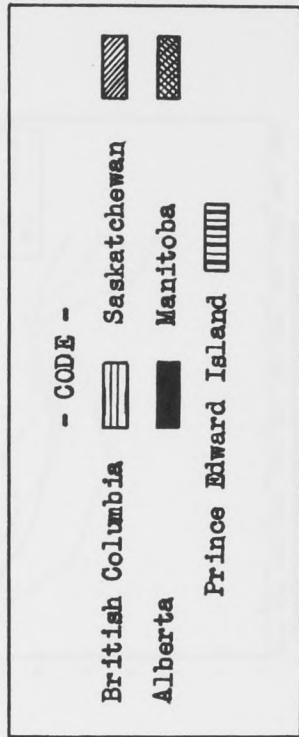


BRITISH COLUMBIA

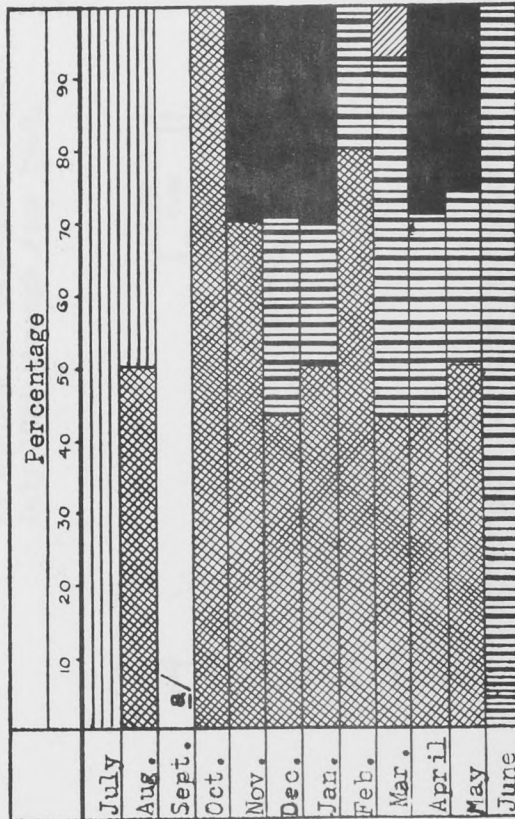


TURNIPS

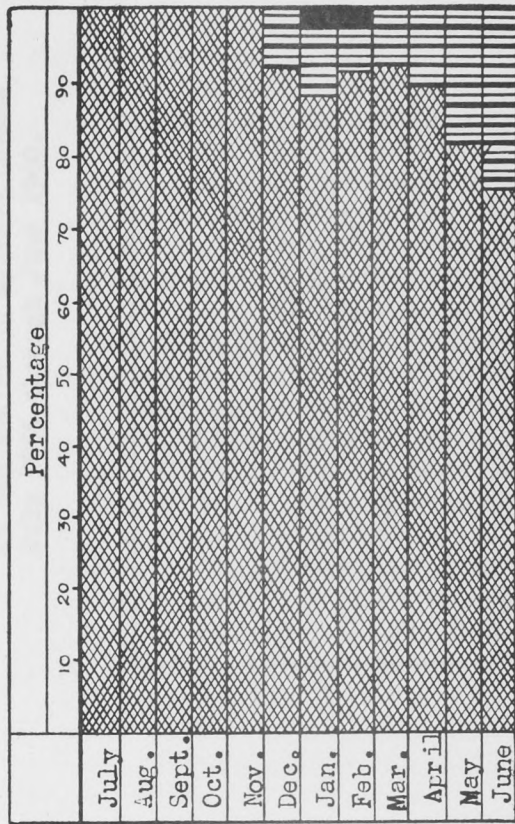
Chart 2A.- The percentage of Turnips from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



SASKATCHEWAN



MANITOBA



a/ Less than one per cent of the annual supply of Turnips entered the Saskatchewan market during the month of Sept. TURNIPS

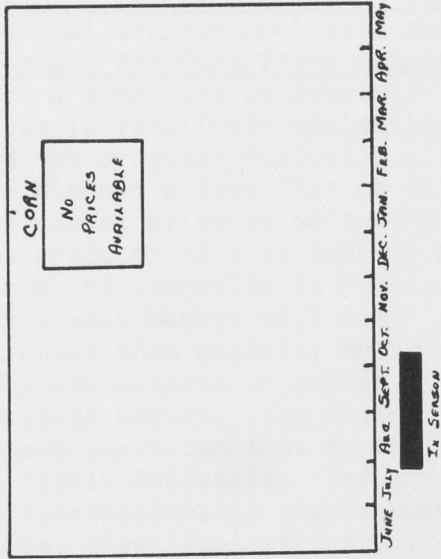


Figure 5.- Prices of Domestic-grown Corn at Wholesales in Western Canada, July 1955 through June 1960.

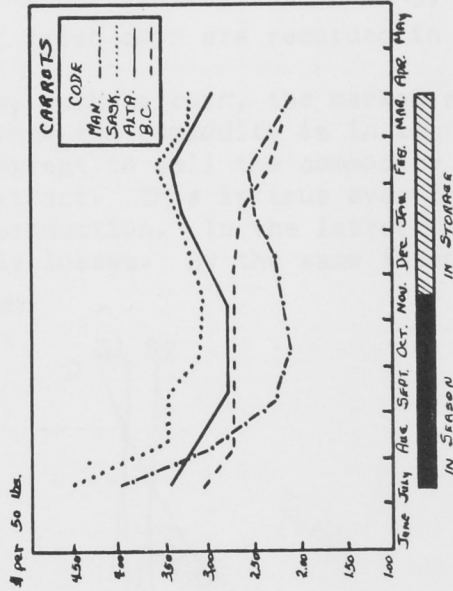


Figure 7.- Prices of Domestic-grown Carrots at Wholesales in Western Canada, July 1955 through June 1960.

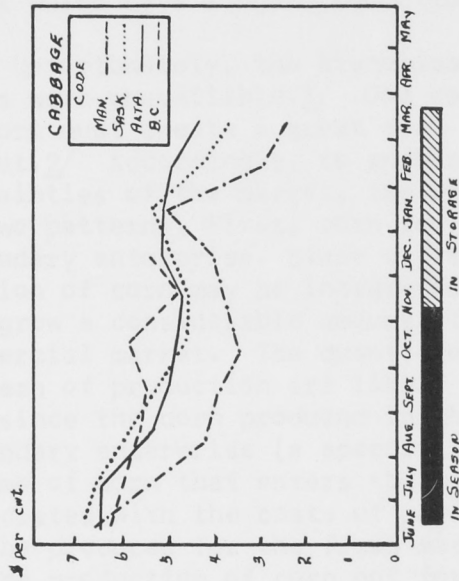


Figure 6.- Prices of Domestic-grown Cabbage at Wholesales in Western Canada, July 1955 through June 1960.

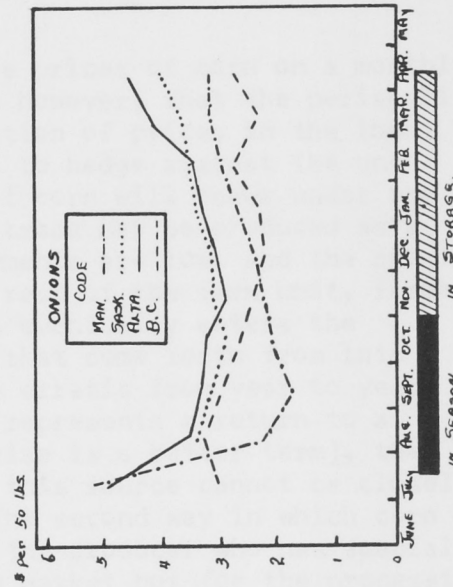


Figure 8.- Prices of Domestic-grown Onions at Wholesales in Western Canada, July 1955 through June 1960.

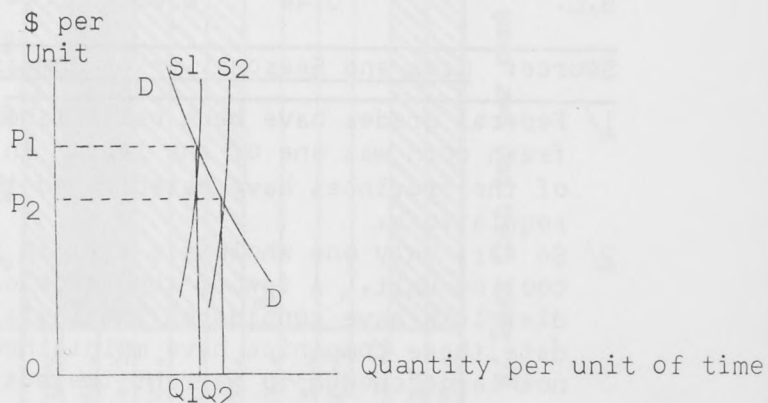
transporting fresh corn. It is therefore natural that during the "in season" corn should be supplied almost exclusively from local sources. At other times of the year the comparative advantage lies with those areas which have longer production seasons.

Unfortunately, the historical wholesale prices of corn on a monthly basis were unavailable.^{1/} One can surmise, however, that the perishability of corn must create a great deal of fluctuation of prices in the local market.^{2/} Accordingly, to enable producers to hedge against the uncertainties of the market, the production of corn will occur under one of two patterns. First, corn for the fresh trade may be produced as a secondary enterprise. Since capital requirements are low, and the production of corn may be integrated with the rest of the farm unit, farmers may grow a considerable amount of corn that eventually enters the commercial market. The quantities of corn that come forth from this pattern of production are likely to be very erratic from year to year. And since the corn produced in this manner represents a return to a secondary enterprise (a speculative enterprise is a better term), the volume of corn that enters the market from this source cannot be closely associated with the costs of production. The second way in which corn may be produced for the fresh market is by the producer who has specialized in the production of corn not for the fresh market but for the processing market. Since the same varieties of corn that are suitable for canning are also suitable for the fresh market, some producers in addition to their contracted acreages with the canneries plant an extra acreage of corn for the fresh market. In addition, the canneries have occasionally diverted corn from processing to the fresh market. It is possible that the canneries use the fresh trade as a market to dispose of surplus corn.

One practice that has had a depressing effect upon the price of high quality fresh corn in the Alberta markets is the practice of selling "field run" corn. There are three general procedures used to harvest corn: 1) hand picking; 2) mechanically picking, grading and packing;

^{1/} Seasonal average wholesale quotations of fresh corn are recorded in Crop and Seasonal Price Summaries.

^{2/} When a commodity is extremely perishable, such as corn, the market supply curve is relatively inelastic, because once the commodity is in its prime and the producer has little alternative except to sell the commodity at the highest prices that he is able to extract. This is true even though the market price is below the costs of production. In the latter case the producer will attempt to minimize his losses. By the same token, since the commodity is highly perishable buyers will only purchase that quantity which they can dispose of before spoilage occurs. The market demand curve can thus be depicted as highly inelastic. The effect of fluctuations in supply upon price, given inelastic supply and demand curves, is shown in the insert. Thus a relatively small increase in the quantity offered for sale, exemplified by a shift in supply from S_1 to S_2 , has a relatively large effect upon the price from P_1 to P_2 .



3) mechanically picking and packing on a "field run" basis. The latter often contains a large portion of ears that are generally unsuited to the fresh trade. However, corn harvested in this manner can be placed on the market at a much lower cost than corn that has been graded. Federal grades for fresh corn became effective in 1959.^{1/} The existence of grades now provide a basis by which fresh corn can be differentiated by quality, and to a certain extent this may help to stabilize the price of high quality fresh corn.

In Charts 3 and 3A it may be observed that "in season" Alberta supplies almost 90 per cent of the corn entering the commercial market within the Province, approximately 40 per cent of the commercial market in Saskatchewan, and less than one per cent of the commercial market in British Columbia. It is evident that for a significant expansion in the acreage of fresh corn in Alberta a larger share of the outside markets would have to be obtained, namely Saskatchewan and British Columbia. To enlarge the share of these markets necessitates a lengthy haul of the Alberta grown produce. This in turn means that greater care must be exercised in grading and the proper cooling of Alberta corn that is destined for outside markets. In the Saskatchewan market the main competitor to Alberta is Manitoba, and in recent years the price of fresh corn on Manitoba markets has been generally lower than the price of fresh corn on Alberta markets (Table 1), which indicates that Manitoba may have a price advantage over Alberta in supplying the Saskatchewan market. The price of fresh corn in British Columbia markets has generally been higher than in Alberta and this indicates that perhaps there is an opportunity for Alberta corn to move into British Columbia. In this case, the quality of the Alberta product becomes an important factor since the competitors that Alberta could most easily replace are California and Washington, which we may assume export a high quality product to British Columbia.^{2/}

Table 1.- Average Seasonal Price of Corn per Dozen in the Four Western Provinces, 1956 to 1960

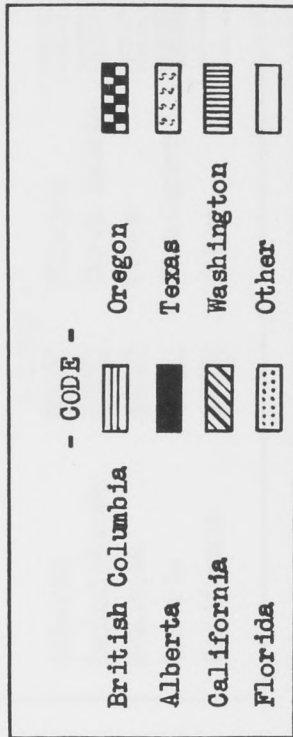
Province	Price per dozen					:Five year :average
	: 1956	: 1957	: 1958	: 1959	: 1960	
Manitoba	0.33	0.37	0.27	0.26	0.32	0.31
Saskatchewan	0.32	0.56	0.48	0.41	0.45	0.44
Alberta	0.51	0.49	0.42	0.53	0.45	0.48
B.C.	0.44	0.48	0.49	0.63	0.62	0.53

Source: Crop and Seasonal Price Summaries 1960-61, Part I.

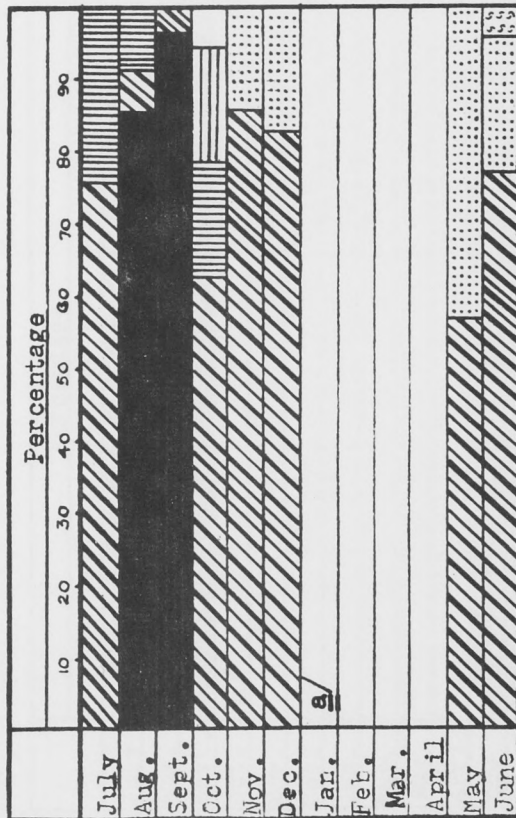
^{1/} Federal grades have been established for nearly all fresh vegetables, fresh corn was one of the last. In addition to federal grades many of the provinces have established their own fresh vegetable grades and regulations.

^{2/} So far, only one wholesale firm in Southern Alberta has installed a hydro-cooling unit. A few of the large canning companies in the irrigation districts have considered the installation of hydro-cooling plants. To date these companies have maintained that the market for fresh corn is not large enough to warrant the cost of such a plant.

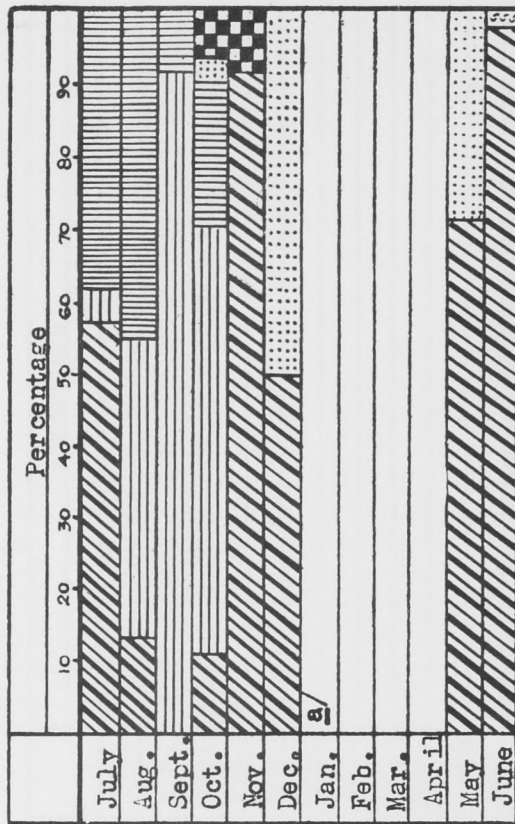
Chart 3.- The percentage of Corn from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



ALBERTA



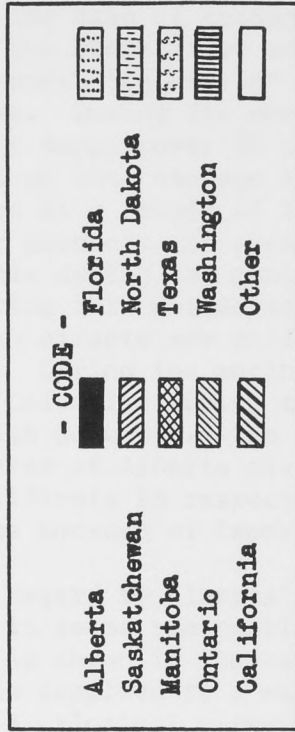
BRITISH COLUMBIA



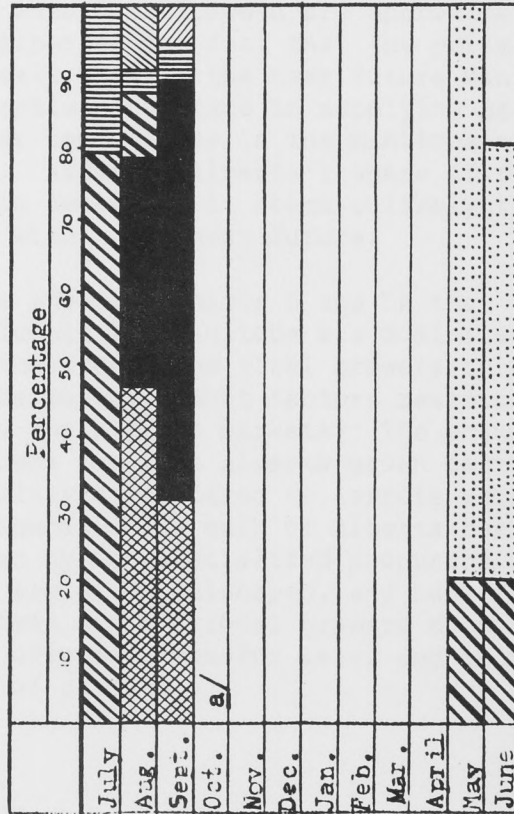
a/ Less than two per cent of the annual supply of corn entered the market during the months January to April.

CORN

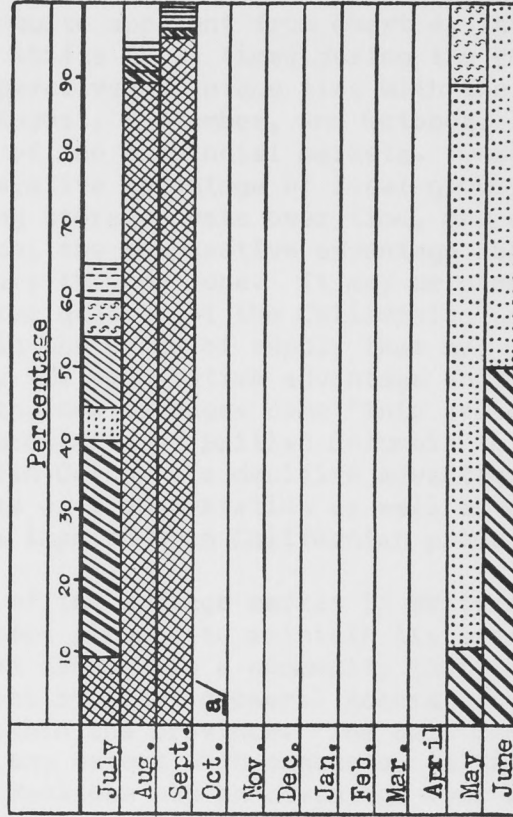
Chart 3A.- The percentage of Corn from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



SASKATCHEWAN



MANITOBA



a/ Less than two per cent of the annual supply of corn entered the market during the months October to April.

CORN

In the case of cabbage it is quite apparent from Chart 4, that in Alberta the comparative advantage shifts three times during the course of one year. "In season" the comparative advantage lies with the local producers. During the months of August, September, and October, local producers supply over 90 per cent of the provincial markets. Once local supplies go into storage the comparative advantage of local growers decreases as a result of increasing storage costs over time, and deterioration of their product. As a consequence, the comparative advantage shifts to California during the months January through June. It may be presumed, that during this period the superior quality of the Californian product more than offsets any difference in the costs of supply that may favor Alberta. During the month of July the comparative advantage shifts to British Columbia. During that month, new cabbages come "into season" in British Columbia. The closer proximity of British Columbia to the market area of Alberta gives British Columbia a decisive advantage over California in respect to costs of transportation as well as an advantage because of import duties imposed upon Californian products.

In regard to Alberta's share of the cabbage market in Western Canada, it seems reasonable to expect Alberta to maintain its present share. As shown in Charts 4 and 4A cabbage is a commodity that in season is supplied to a major extent by local growers. Accordingly, Alberta's principal markets are within the province. The only other province that Alberta supplies to any extent with cabbages, is Saskatchewan. From Chart 4A it is apparent that Manitoba has an advantage over Alberta in supplying cabbage to Saskatchewan. A clue to Manitoba's advantage may be obtained by reference to Figure 6, where it is shown that the wholesale prices in Manitoba "in season" are approximately \$1.00 per hundredweight below the wholesale prices in both Alberta and Saskatchewan. Since the costs of transportation into Saskatchewan are approximately the same from either Manitoba or Alberta, the fact that the price of cabbage is lower in Manitoba suggests that in the near future Manitoba will continue to maintain a comparative advantage in supplying Saskatchewan. The low prices of cabbage and other commodities in the Manitoba market are discussed in the next chapter. As far as Alberta's share of the cabbage market in Western Canada is concerned it seems unlikely that any substantial change will occur within the near future.

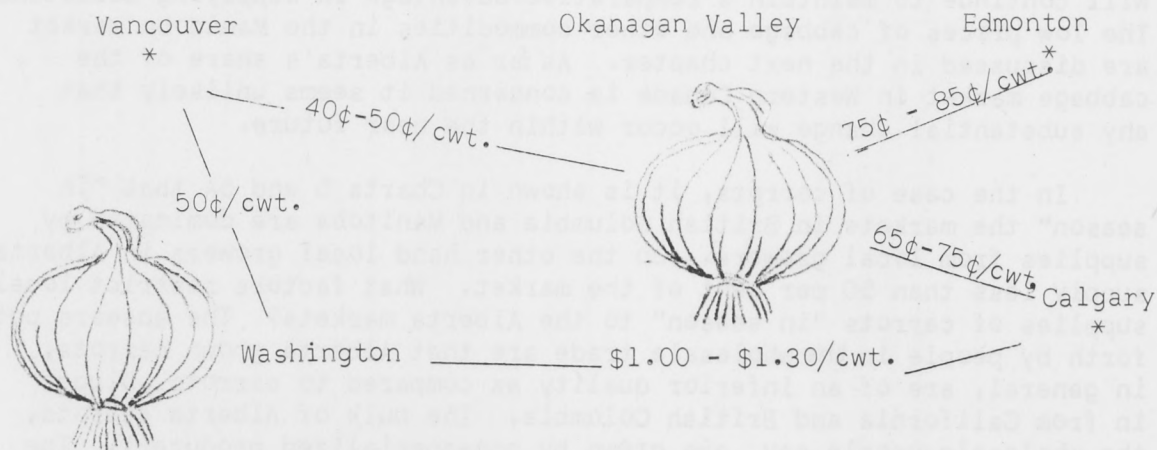
In the case of carrots, it is shown in Charts 5 and 5A that "in season" the markets in British Columbia and Manitoba are dominated by supplies from local growers. On the other hand local growers in Alberta supply less than 50 per cent of the market. What factors restrict local supplies of carrots "in season" to the Alberta markets? The answers put forth by people in the wholesale trade are that Alberta grown carrots, in general, are of an inferior quality as compared to carrots shipped in from California and British Columbia. The bulk of Alberta carrots, the wholesale people say, are grown by non-specialized producers. The carrots that are produced locally are often malshaped, and have inferior storage qualities. The reasons given are the local growers do not as a rule grade their carrots before offering them for sale, and in many cases they grow the wrong variety of carrot.

If these difficulties could be overcome Alberta could at least increase its local marketings of carrots during the "in season". The question of packing carrots in polyethylene bags and the consumer preference for fancy packs cannot be raised as a factor against local supplies, since if the quality and quantity of local supplies are forthcoming the wholesale firms will do their own packaging.

The remaining commodity that is included in Group II is dry onions. While onions have better storage qualities than the other vegetables included in the group, they are perhaps, more difficult to grow in particular areas than the other vegetables that have been considered so far.

Upon looking at Charts 6 and 6A onions appear to be rather a "cosmopolitan" type of vegetable, inasmuch that areas of supply are in many different countries. This may be explained in part by the apparent consumer preference for many different types of onions of different degrees of mildness. However, the bulk of the onions originates from areas of supply that are relatively close to the market. For instance, in season, local supplies dominate the market in Manitoba. The surprising thing is to discover that British Columbia has the apparent comparative advantage in supplying Alberta, while Oregon and Washington supply British Columbia. This may be explained in part by the fact that the higher prices of onions in Alberta divert produce grown in the Okanagan Valley to Alberta rather than to the Vancouver market.^{1/}

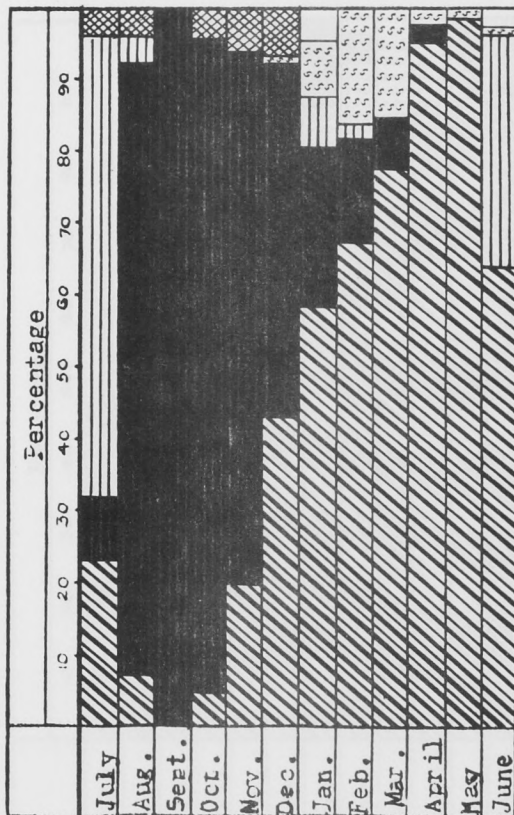
^{1/} The Okanagan Valley is located approximately 275 miles East of Vancouver and approximately 500 to 700 miles West of Calgary and Edmonton, respectively. The movement of onions into British Columbia and into Alberta is shown diagrammatically below.



The transportation cost per hundredweight are approximations. Thus when the onion prices in Calgary and Edmonton are 25 and 35 cents above the prices in Vancouver, one can expect the Okanagan to divert its shipments to the Alberta market. At the same time Washington will continue to ship to the Vancouver market.

Chart 4.- The percentage of Cabbage from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.

ALBERTA



CABBAGE

BRITISH COLUMBIA

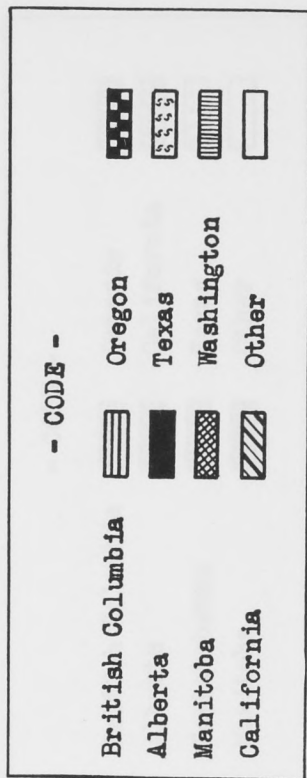
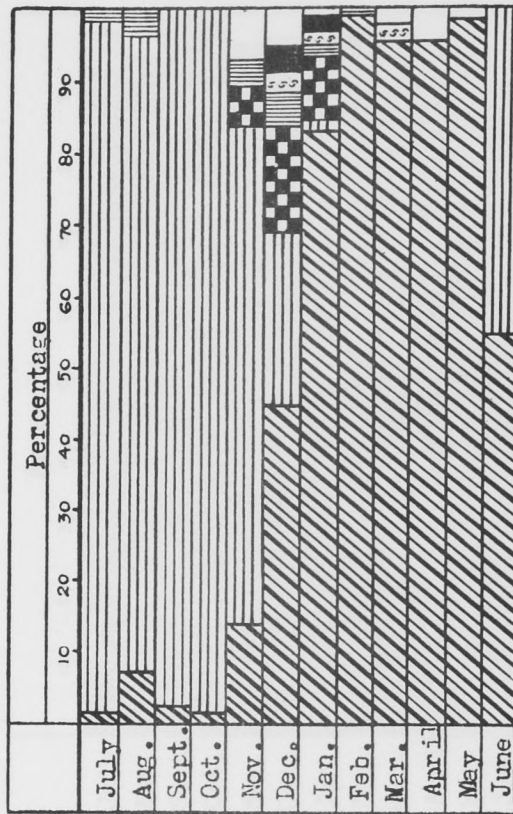
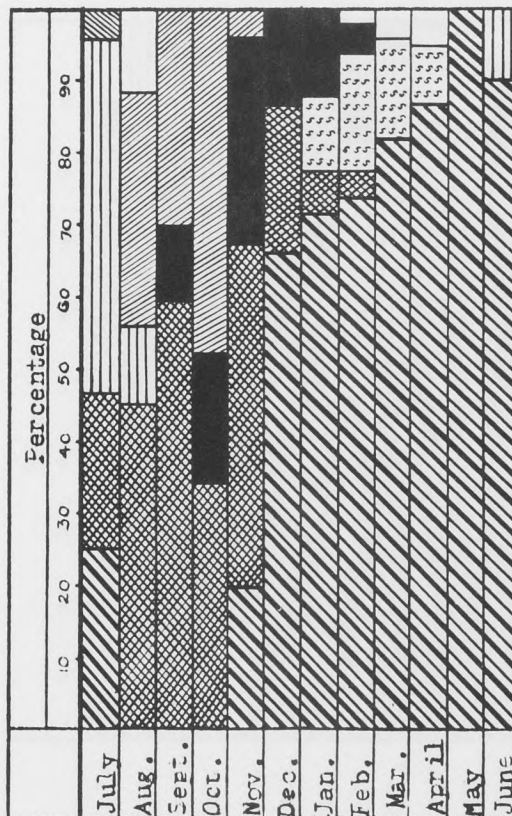
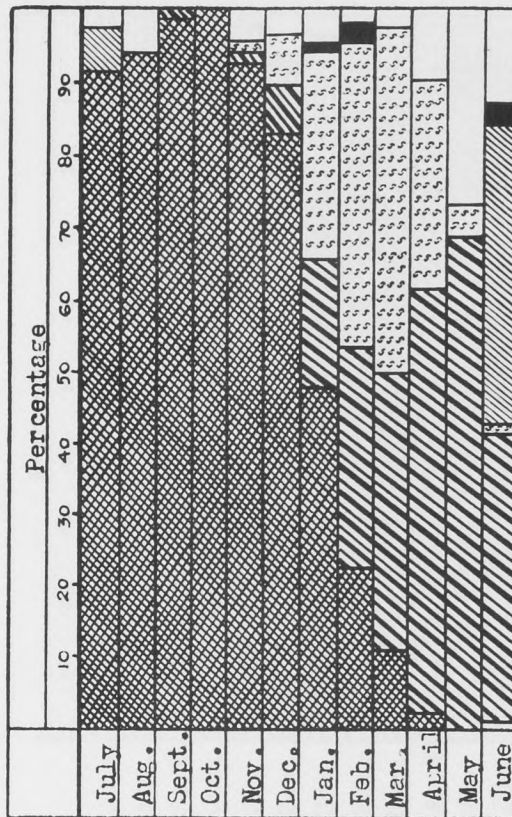


Chart 4A.- The percentage of Cabbage from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.

SASKATCHEWAN

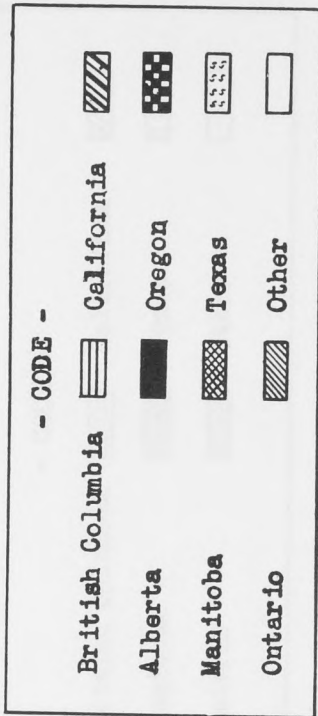


MANITOBA

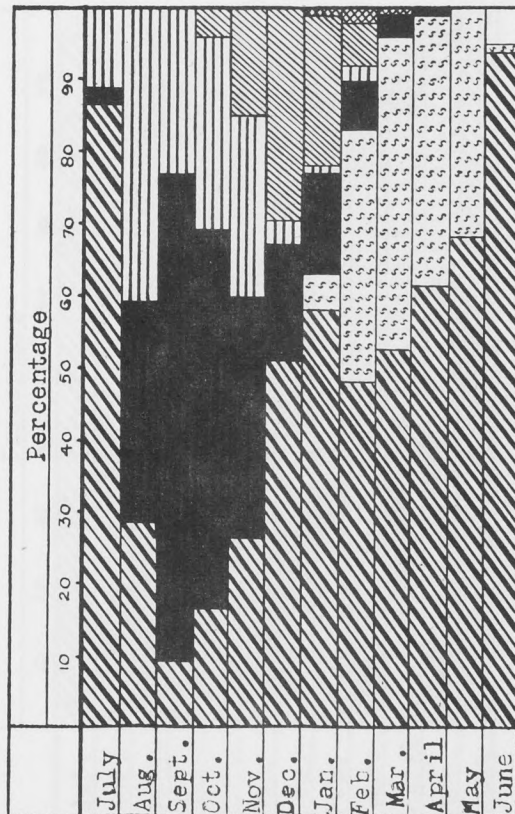


CABBAGE

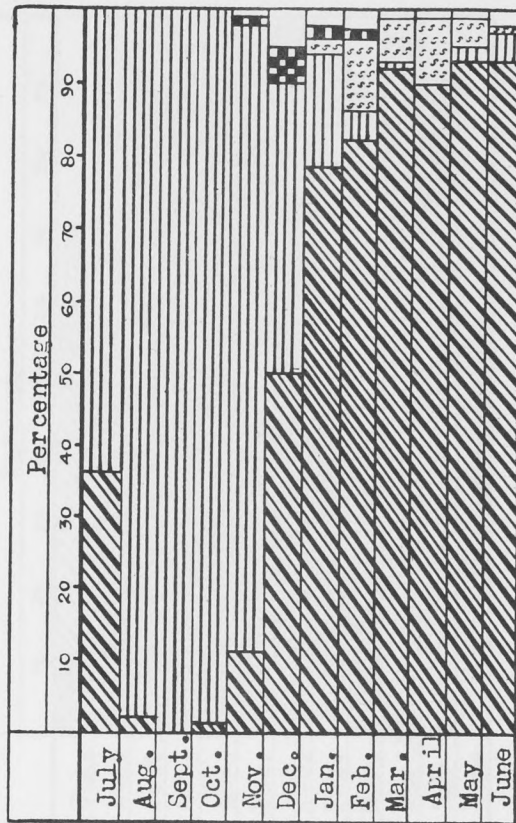
Chart 5.- The percentage of Carrots from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



ALBERTA



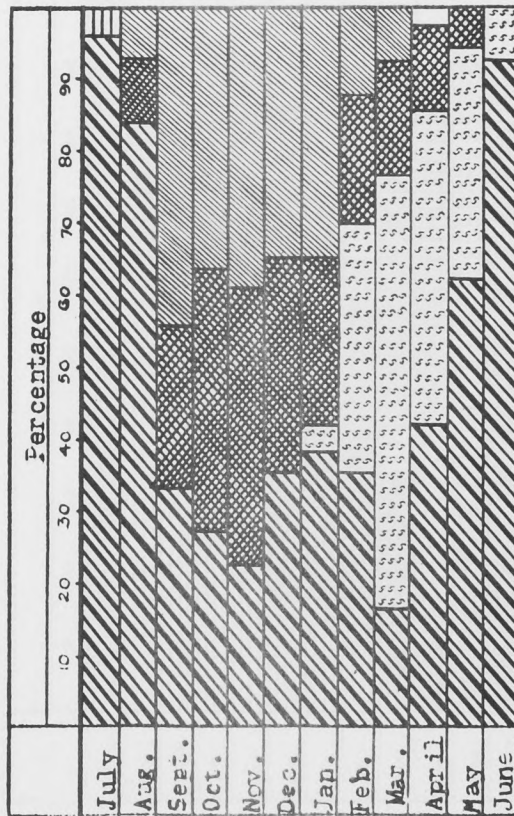
BRITISH COLUMBIA



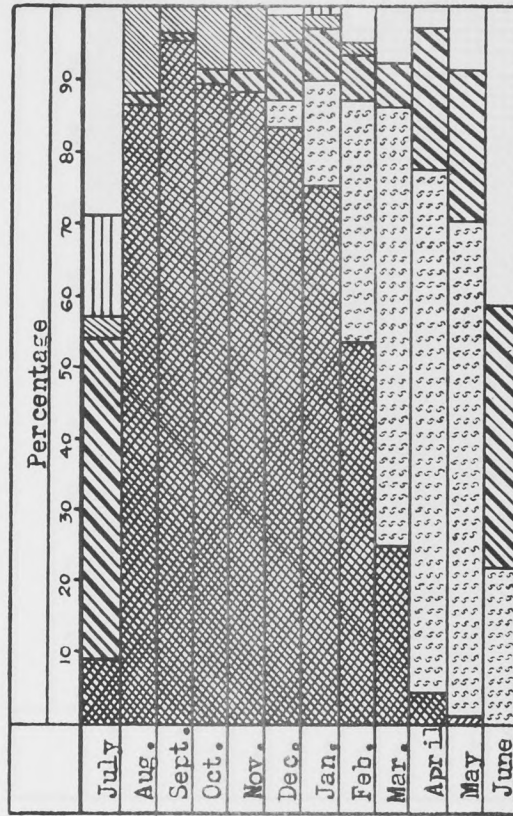
CARROTS

Chart 5A.- The percentage of Carrots from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.

SASKATCHEWAN

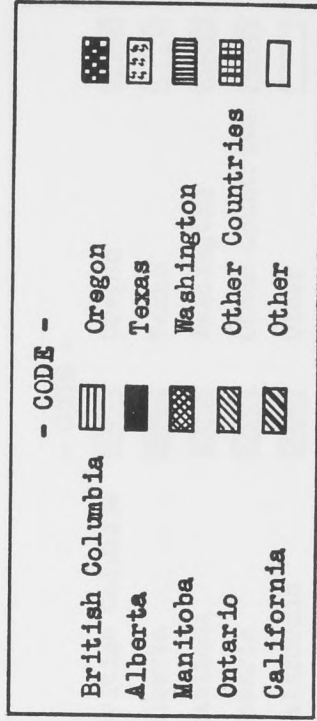


MANITOBA

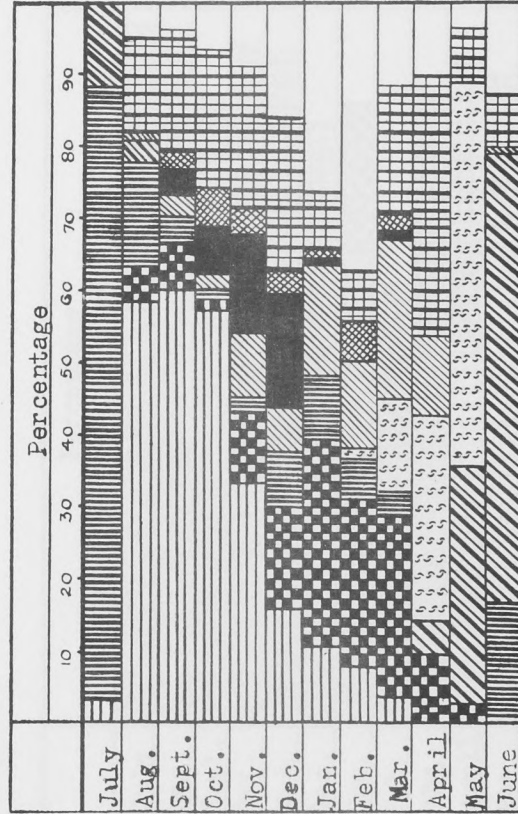


CARROTS

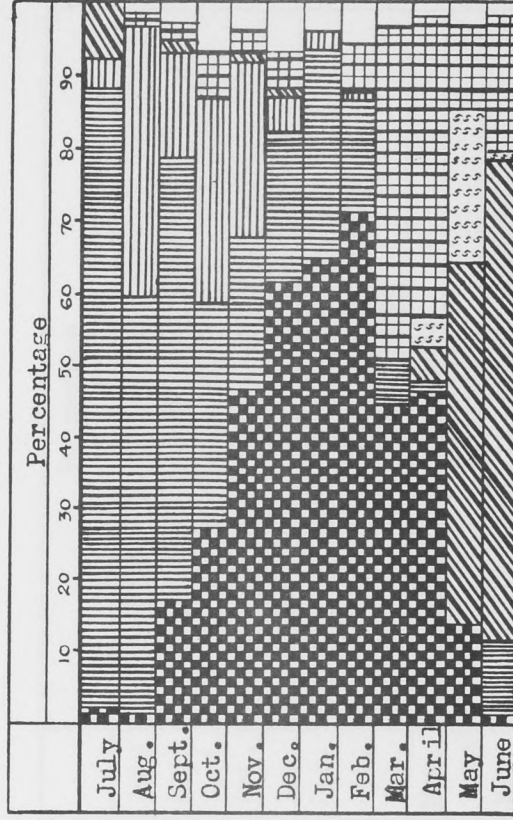
Chart 6.- The percentage of Onions from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



ALBERTA



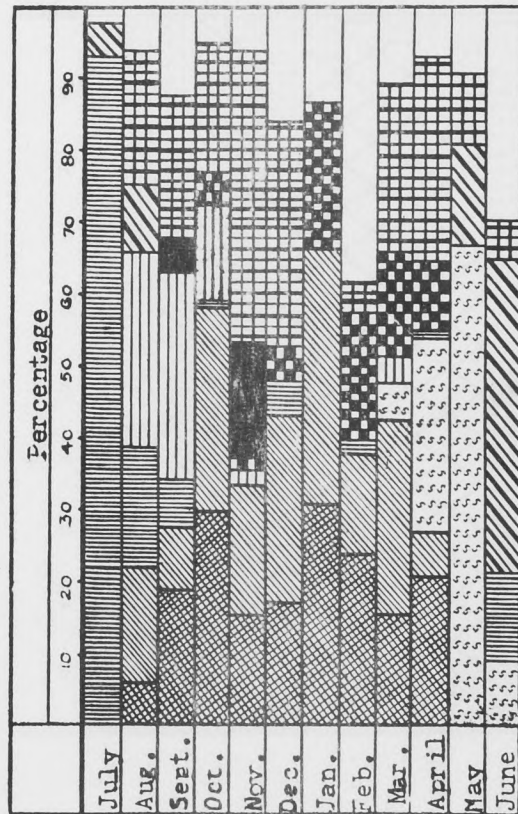
BRITISH COLUMBIA



ONIONS

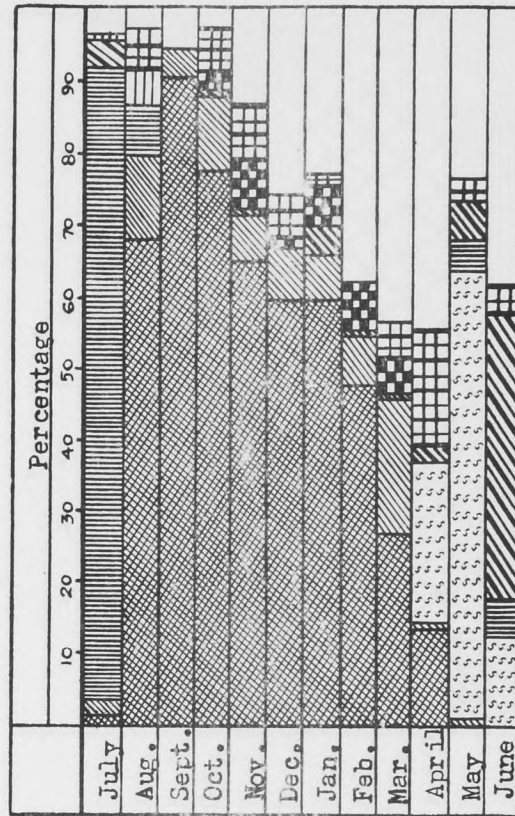
Chart 6A.- The percentage of Onions from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.

SASKATCHEWAN



ONIONS

MANITOBA



- CODE -

British Columbia

Alberta

Manitoba

Ontario

California

Oregon

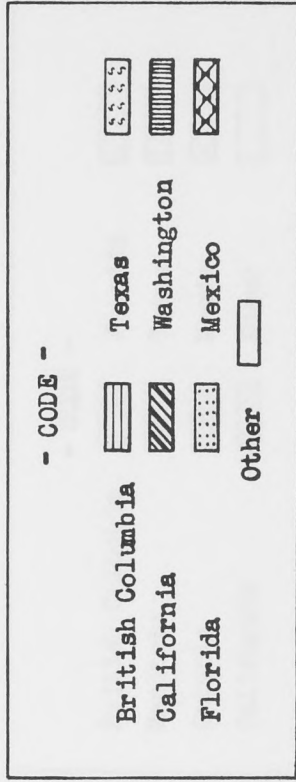
Texas

Washington

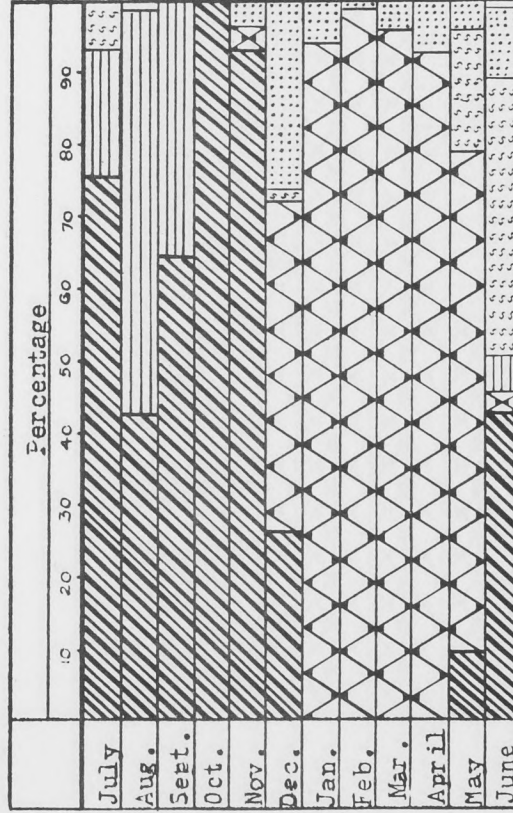
Other Countries

Other

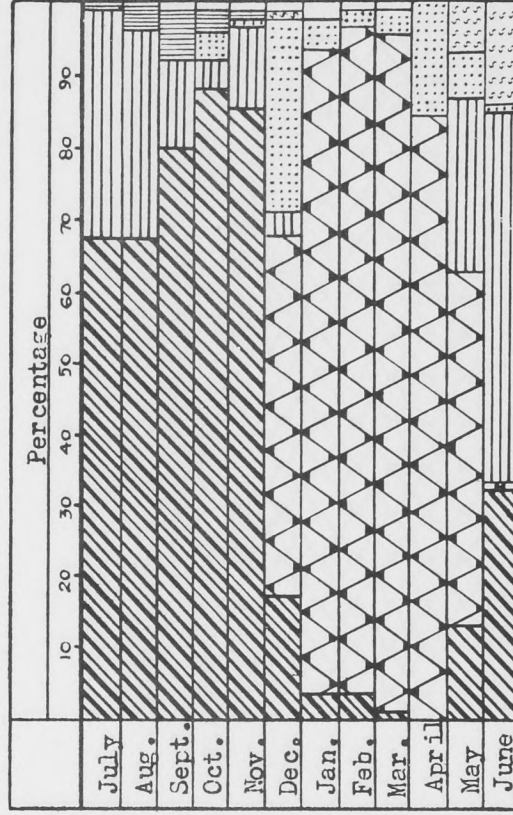
Chart 7.- The percentage of Tomatoes from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



ALBERTA

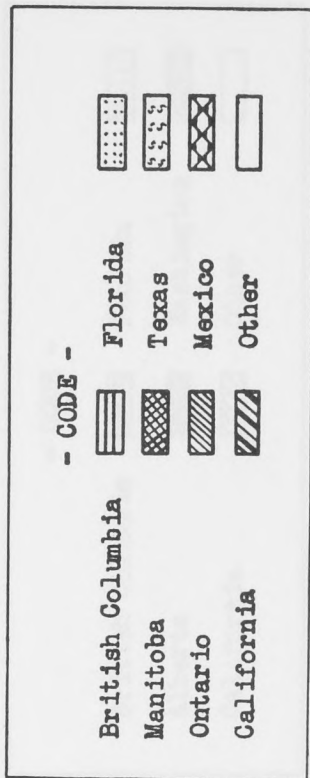


BRITISH COLUMBIA

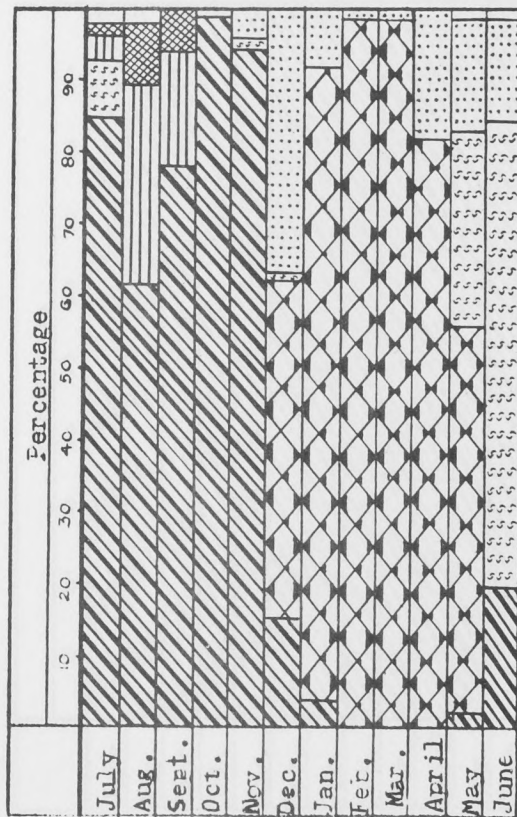


TOMATOES

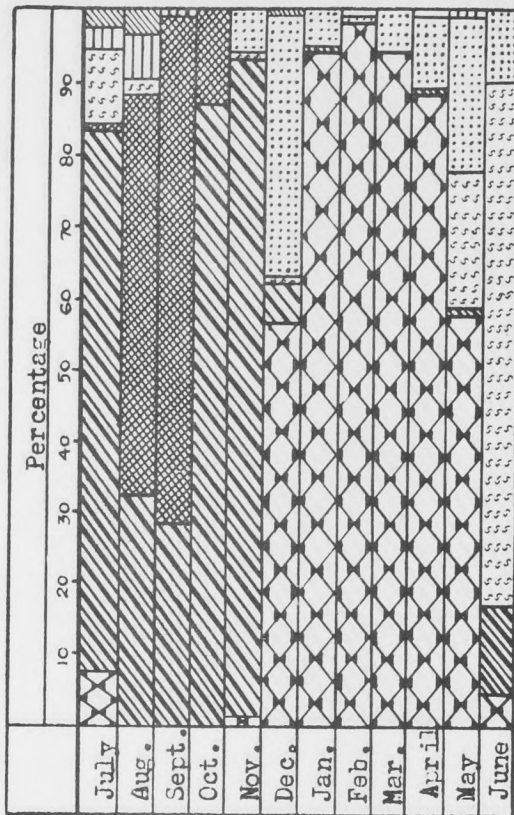
Chart 7A.- The percentage of Tomatoes from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



SASKATCHEWAN

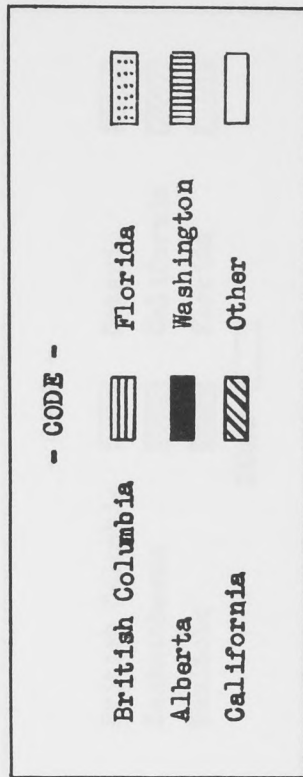


MANITOBA

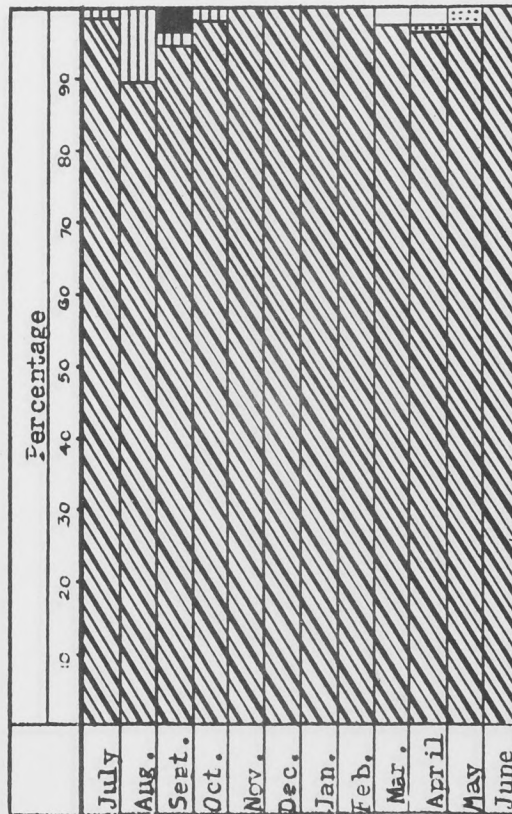


TOMATOES

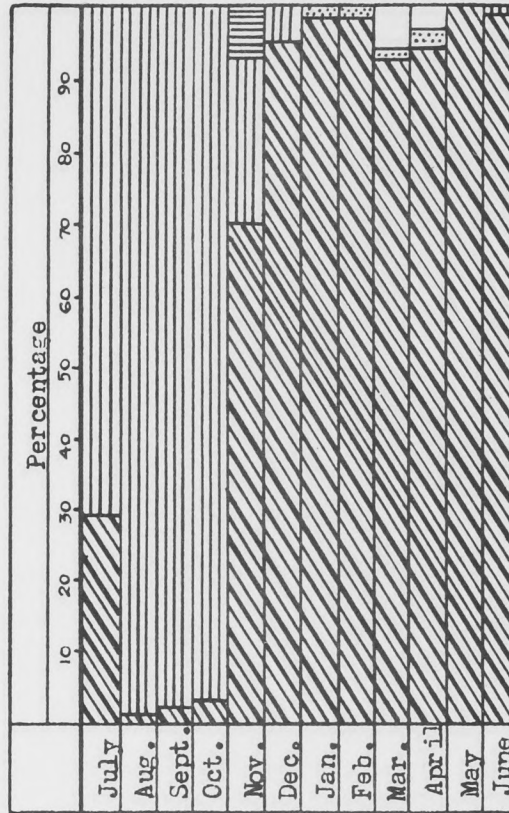
Chart 8.- The percentage of Celery from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.



ALBERTA



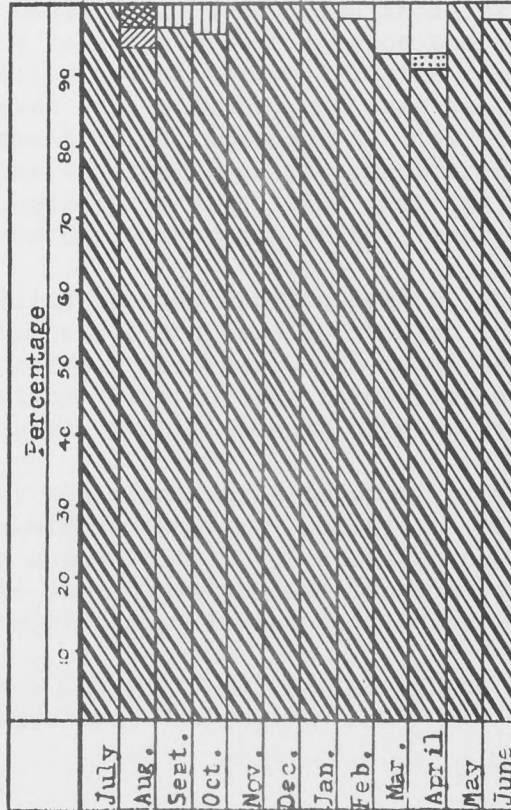
BRITISH COLUMBIA



CELERY

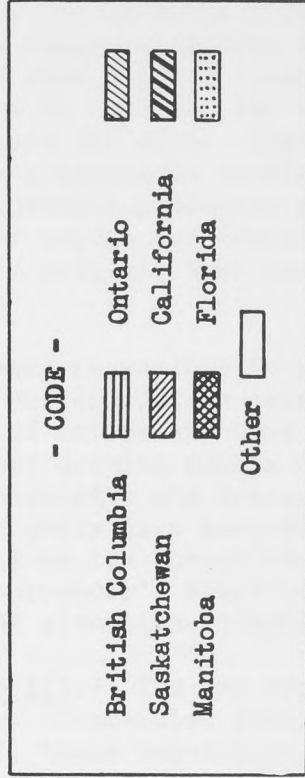
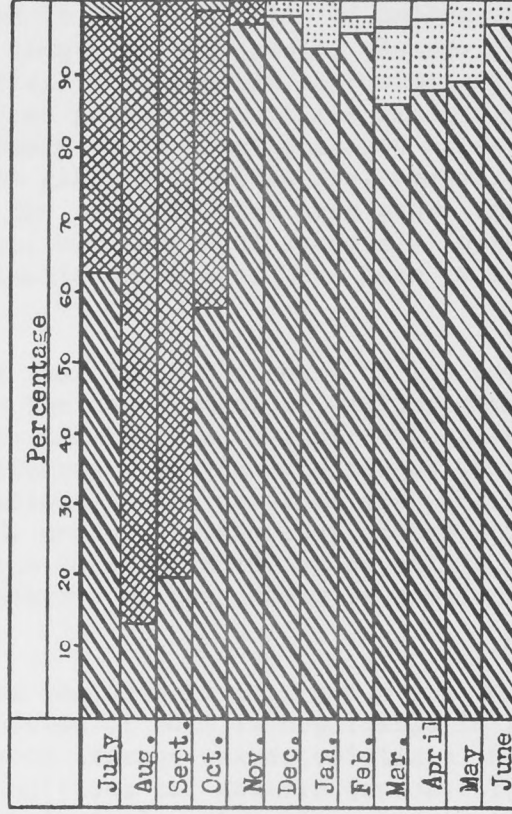
Chart 8A.- The percentage of Celery from different areas of supply that each month enter the commercial markets in Western Canada. Based on a five year average, July 1955 through June 1960.

SASKATCHEWAN



CELERY

MANITOBA



One of the problems encountered in the production of onions on a commercial scale in Alberta is the length of the growing season. When onions are sown directly into the field they require approximately 110 to 120 days to mature. The frost-free period in Southern Alberta is approximately 120 days. The relatively short growing season makes onion production a hazardous enterprise in Alberta.^{1/} There are, however, several vegetable producers within the province that have grown small acreages of onions for several years, with apparent success. In these cases it is possible that local climatic conditions have been important factors.

It seems reasonable to believe that Alberta's share of the onion market in Western Canada depends on the development of earlier maturing varieties of onions and upon further knowledge with regard to management practices of growing onions under Alberta climatic conditions. To this end the university and research stations in the province are working. Once these goals have been obtained, presumably the cost of producing onions will be low enough to give the local producer an advantage, and the local producer's share of the Alberta market should be similar to the present situation in Manitoba.

Group III.- The two vegetables included in this group are tomatoes and celery. Commercial field production of both is negligible in Alberta. In general, these vegetables have poor storage characteristics; they are not well adapted to the climatic conditions of Western Canada. They require a considerable amount of labor in their production, and in the marketing of these vegetables the quality of the product is an extremely important factor. It may be noted that in the grouping of these vegetables we have progressed from vegetables with relatively good storage characteristics which can be grown under field conditions in an extensive manner, towards vegetables that have relatively poor storage characteristics and which require intensive cultivation and attention. In the case of Group III another factor must be taken into account, and that is the quality of the product. This statement is not intended to imply that quality is not important in the other vegetables so far considered, but in the case of tomatoes and celery quality is especially important since these vegetables are usually consumed while they are in the fresh state.

Both tomatoes and celery require a lengthy growing period, and both vegetables when grown on a commercial scale are usually started in greenhouses or hotbeds. For example, tomatoes require from 30 to 40 days in greenhouses and cold frames and another 70 to 80 days in the field before the plants bear fruit.^{2/} Celery requires a still longer growing season

^{1/} During 1958-1959 an onion company was formed by a group of producers in the irrigation districts of Southern Alberta. During the crop year 1959-60 the company planted approximately 400 acres of hybrid onions. (The largest portion was sown directly into the field). Due to inclement weather and an early frost in the fall, nearly the entire crop of onions was lost.

^{2/} Commercial Production of Tomatoes, Farmers' Bulletin No. 2045, United States Department of Agriculture, Washington.

with approximately 40 to 60 days in the seed beds and another 120 days in the field.^{1/} In Alberta, the harvest period and the storage period are relatively short for both of these vegetables. Tomatoes commence to bear fruit during the latter part of July. However, the season abruptly ends with the first killing frost which usually occurs mid-September. While it is true that tomatoes grown in the family garden are often stored and ripened in the family dwelling for periods up to three months, on a commercial basis it would appear impractical to store tomatoes for more than one month because of spoilage and deterioration in quality; not to mention the added cost of storage in the way of space, temperature control, and labor.

Celery, when grown in Alberta, generally is not harvested until September and October. Celery can withstand a limited amount of frost in the fall, because it is protected by the soil. However, it is very sensitive to cold weather in the spring, since a "chill" while the plants are small may cause them to bolt later and to set seed rather than form stalks.

Celery may be stored for a period of two to three months, providing temperature and humidity conditions are correct. One wholesale purchasing agent stated that the cost of storing celery was only a few cents per hundred pounds below the cost of transporting fresh celery into Alberta from California, and that the superior quality of the fresh celery gave it a decisive advantage in the retail market.^{2/} The same person also commented on the "toughness" of local celery and celery that is grown in British Columbia. He made the claim that celery grown locally and in British Columbia was usually "tough" and "stringy" and as a result the popularity of domestic grown celery was declining in Alberta. The poor quality of celery he attributed to production techniques, and in part to the packaging and handling of the celery after it has been produced.

It was pointed out by people in the wholesale trade that uniformity of size and a lack of blemishes was a desirable quality in tomatoes. Also, it was pointed out that tomatoes for the fresh trade should be "fleshy" and have thick walls and thick but not tough skins which can withstand considerably handling. On the other hand, tomatoes for the processing trade should be "juicy" with thin skins which are tough and easily peeled. It was also pointed out that tomatoes when grown for processing should ripen with uniformity throughout the field and within a short period of time so they may be harvested in one operation. On the other hand a field of tomatoes grown for the fresh trade should ripen in stages. This points to fundamental differences that exist between the production of tomatoes for the fresh trade and production of tomatoes for canning and processing. Different products are required in each trade. Moreover, the problems encountered in the marketing of tomatoes for the fresh trade are quite different from those for processing. The length of the harvesting period and the storage period is a very important factor in marketing fresh tomatoes.

^{1/} Celery Growing, Farmers' Bulletin No. 1269, United States Department of Agriculture, Washington.

^{2/} From discussions and interviews held with men in the wholesale trade.

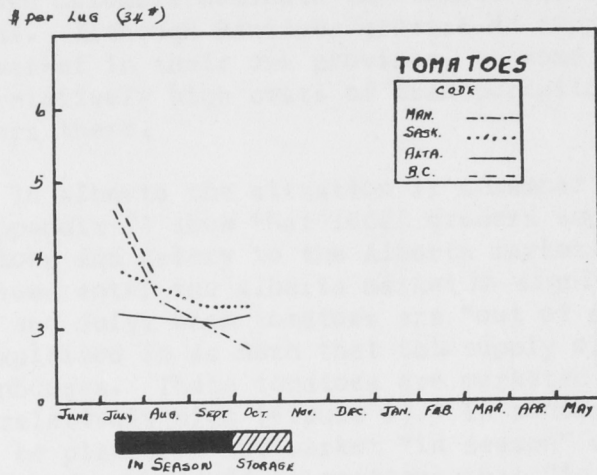


Figure 9.- Prices of Domestic-grown Tomatoes at Wholesales in Western Canada, July 1955 through June 1960.

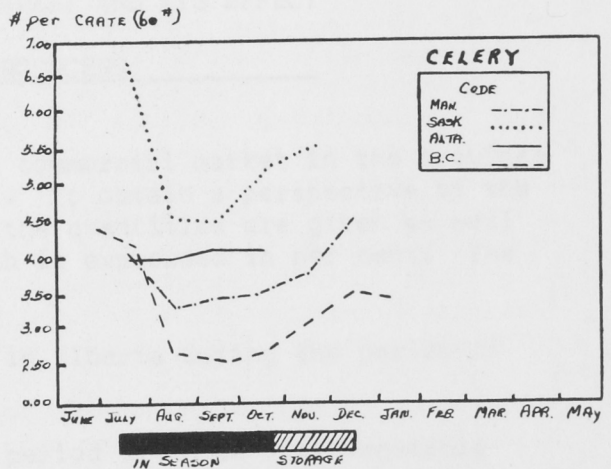


Figure 10.- Prices of Domestic-grown Celery at Wholesales in Western Canada, July 1955 through June 1960.

In Charts 7 to 8A it is shown that "in season" California and British Columbia dominate the tomato and celery markets in Western Canada. Although Manitoba growers do supply a substantial portion of the market in their own province, to some extent this is probably due to the relatively high costs of transportation which serve to protect the growers there.

In Alberta the situation is somewhat different. Tables B3 and B7 in Appendix II show that local growers supply only a small quantity of tomatoes and celery to the Alberta market. Indeed, local grown tomatoes enter the Alberta market in significant quantities only during June and July, when tomatoes are "out of season". This apparent anomaly is explained in as much that this supply of tomatoes originated in local greenhouses. These tomatoes are marketed during a period in which prices are relatively high (Figure 9). In contrast, local field grown tomatoes must be placed on the market "in season" while prices are seasonally depressed. While it is apparent that "in season" a substantial market does exist in Alberta for celery and tomatoes, approximately one million and four million pounds respectively (Tables A3 and A7, Appendix I), it is also apparent that given the present state of technology Alberta producers are unable to successfully compete against those areas that have a longer growing period. The latter have the additional advantage inasmuch that they supply a very large market and as a consequence the costs of production per unit of output are reduced considerably due to specialization and large scale operations. The size of the commercial market and its effect upon Alberta producers are dealt with in the following chapter.

CHAPTER IV

SIZE OF THE COMMERCIAL MARKET AND ITS EFFECT

UPON ALBERTA PRODUCERS

In Table II Alberta's share of the commercial market in the Province is summarized for the eight vegetables. To obtain a perspective of the size of the market for each vegetable the quantities are given as well as Alberta's share of the market, which is expressed in per cent. The Table is divided into three parts:

- a) the size of the commercial market in Alberta during the period of one year;
- b) the size of the market during the period in which each vegetable crop is "in season" in Alberta; and
- c) the size of the market during the period in which each vegetable is "out of season" in Alberta.

The latter includes Alberta grown supplies that originate from storage. The time of the "in season" period was somewhat arbitrarily assigned because

Table II.- Alberta's Share of the Commercial Market in Alberta for Eight Fresh Vegetables during the Period:
a) One year; b) "In Season", and c) "Out of Season"; Based on a Five Year Average, July 1955 through June 1960

	Group I		Group II		Group III	
	Potatoes:	Turnips:	Corn :	Cabbage :	Carrots :	Onions : Tomatoes : Celery
a) Size of the commercial market in Alberta; in '000 lb. <u>a/</u>	67,359	3,964	2,212	9,165	7,086	10,920 14,363 7,342
Alberta's share of the market; in '000 lb. <u>b/</u> in per cent	54,167 80.4	3,305 83.4	1,247 56.4	2,721 29.7	1,025 14.5	427 3.9 33 <u>c/</u> 16 0.2 0.2
b) The "in season" period of supply relative to Alberta	Aug.- Oct.	Aug.- Oct.	Aug.- Sept.	Aug.- Oct.	Aug.- Oct.	Aug.- Sept. Oct.
Size of the market "in season"; in '000 lb. <u>a/</u>	14,981	694	1,292	1,320	1,218	2,396 3,981 1,294
Alberta's share of the market "in season"; in '000 lb. <u>b/</u> in per cent	14,226 95.0	674 97.1	1,247 96.5	1,200 90.9	517 42.4	99 4.1 0 16 0 1.2
c) "Out of season" period of supply relative to Alberta	Nov.- Jul.	Nov.- Jul.	Oct.- Jul.	Nov.- Jul.	Nov.- Jul.	Nov.- Jul.
Size of the market "out of season"; in '000 lb. <u>a/</u>	52,378	3,270	920	7,845	5,868	8,524 10,382 6,048
Alberta's share of the market "out of season"; in '000 lb. <u>b/</u> in per cent	39,941 76.2	2,631 80.5	0 0	1,521 19.4	508 8.6	328 3.8 33 <u>c/</u> 0 0.3 0

a/ Appendix I.
b/ Appendix II.
c/ Greenhouse tomatoes.

the data used are based on months. Thus, while local grown new potatoes enter the market during the second and third weeks in July the larger volumes come in August. Similarly, while the harvest period is generally over during the last week in September and the first week in October, much of the produce does not go into regular storage until the end of October. The "in season" of potatoes was therefore designated as August through October.

The percentages shown in the tables are summaries of the bar charts of Alberta that are illustrated in Charts 1 through 8. As noted in the last chapter, "in season" local supplies account for more than 90 per cent of the potatoes, turnips, corn and cabbage that enter the Alberta market. Obviously, during the "in season" it is impossible for local growers to increase their share of the market by any substantial amount. Out of season, the share of the market held by local growers is somewhat less. But, out of season the share of the market held by local growers is not only dependent upon the adaptability of the particular vegetable to the climate in Alberta, but is also dependent upon the storage characteristics of the vegetable. Consequently, in the case of the fore mentioned vegetables if local growers are to increase the quantity of produce that they sell in the provincial market they will have to rely primarily upon growth in the size of the market. In the case of carrots and onions there is room for the local growers to increase their share of the provincial market as well as relying upon a growth in the size of the market. This is also true of tomatoes and celery. However, the lengthy growing season of the latter provides reason to believe that local supplies will not expand to any great extent.

Just as Table II depicts Alberta's share in the provincial market, so Table III depicts Alberta's share of the commercial market in Western Canada.

One of the factors that limit the size of Alberta's share of the market in the other three western provinces is that when a particular vegetable is in season in Alberta, it is also in season in the other provinces.^{1/} This is also generally true of the time during which the commodity is in storage in Alberta. Hence, in order for Alberta growers to enlarge their share of the market in another province, they must compete to some extent with local supplies in that province as well as compete with other areas of supply that are relatively close to that province. Thus, transportation charges become an important factor in determining the size of the market in which any specific area of supply may successfully compete. While high costs of transportation are to the advantage of the local grower in the local market, because they give him a locational advantage, at the same time they are to his disadvantage when he attempts to invade an "outside" market with his produce.

^{1/} Based on the time of the year that produce from the different provinces enter the market it would appear that the growing season in British Columbia is approximately four weeks earlier than in Alberta or Manitoba. The growing season in Saskatchewan, it appears, is approximately two weeks later than Alberta or Manitoba. British Columbia, of course, has the advantage of a long growing season as compared to the other three provinces. For marketing data, see Crop and Seasonal Price Summaries.

Table III.-- Alberta's Share in the Commercial Market in Western Canada for Eight Fresh Vegetables during the Period:
a) One year; b) "In Season", and c) "Out of Season"; Based on a Five Year Average, July 1955 through June, 1960

	Group I			Group II			Group III		
	Potatoes	Turnips	Corn	Cabbage	Carrots	Onions	Tomatoes	Celery	
a) Size of the commercial market in Western Canada; in '000 lb. <u>a/</u>	351,177	18,237	9,095	39,012	40,477	50,023	56,911	30,626	
Alberta's share of the market; in '000 lb. <u>b/</u> in per cent	77,736 22.1	7,149 39.2	1,497 16.4	3,097 7.9	1,025 2.5	604 1.2	335 0.05	16 0.05	
b) The "in season" period of supply relative to Alberta	Aug.- Oct.	Aug.- Oct.	Aug.- Sept.	Aug.- Oct.	Aug.- Oct.	Sept.- Oct.	Aug.- Sept.	Aug.- Oct.	
Size of market "in season"; in '000 lb. <u>a/</u>	91,987	4,064	5,626	7,474	8,655	11,472	14,685	7,251	26
Alberta's share of the market; "in season"; in '000 lb. <u>b/</u> in per cent	18,108 19.7	1,120 27.6	1,497 26.6	1,261 16.9	517 6.0	164 1.4	0 0.0	0 0.2	16
c) "Out of season" period of supply relative to Alberta	Nov.- Jul.	Nov.- Jul.	Oct.- Jul.	Nov.- Jul.	Nov.- Jul.	Nov.- Aug.	Oct.- Jul.	Nov.- Jul.	
Size of the market "out of season"; in '000 lb. <u>a/</u>	259,190	14,173	3,469	31,538	31,822	38,551	42,226	23,375	
Alberta's share of the market "out of season"; in '000 lb. <u>b/</u> in per cent	59,628 23.0	6,029 42.5	0 0.0	1,836 5.8	508 1.6	440 1.1	335 0.08	0 0.0	

a/ Appendix I.

b/ Appendix II.

c/ Greenhouse Tomatoes.

To overcome this disadvantage the Alberta producer must have his costs of production, or his costs of production and costs of storage (depending upon the season) below that of his competitors in the other province by a difference equal to the cost of transportation.^{1/} In this case, the Alberta producer may be said to be substituting costs of transportation for costs of production (and storage). In any case, it should be obvious that the most important markets to any vegetable producer are the markets which are the closest. Undoubtedly, Edmonton and Calgary are the two most important urban markets for Alberta producers.

In Table IV the importance of the Alberta market to the local producer is shown. Of the total quantity of potatoes that originates in Alberta and that enters the commercial markets, approximately 70 per cent is sold within the province. In the case of turnips only 42 per cent of commercially grown turnips originating in Alberta actually enters the provincial market. In regard to the other crops, however, it is to be noted that local growers are very dependent upon the Alberta market.

So far we have been mainly concerned with the physical characteristics of growth and storage of each vegetable, their relationship to the climate in Alberta, the proximity of the area of supply to the market, and the manner in which these affect the comparative advantage of Alberta as an area of supply. Of equal importance, however, is the size of the market that is available to Alberta vegetable producers. There is a direct relationship between the size of the market and the degree of specialization in production that is required to satisfy that market. Obviously a producer cannot specialize in the production of a particular commodity unless he has a market in which to sell his entire output. The larger the market the greater the degree of specialization. Greater specialization by a number of producers may in turn bring about both external economies and internal economies in production within a specific region, hence increasing the comparative advantage of that region.

The number of acres that are required to satisfy the commercial market in Western Canada for the eight vegetables is shown in Table V. The starting point in this table was the size of the commercial market during a period of one year, based on the five-year average July 1, 1955 to June 30, 1960. From the size of the commercial market the quantity of field run vegetables that were required to supply the given commercial market was estimated, line 2 in Table V.^{2/} The quantity of field run vegetables is necessarily greater than the quantity that enters the commercial market because of the addition of culls, shrinkage, spoilage, waste, seed, self-supplies, and so on. Accordingly, the commercial market was adjusted upwards to allow for 35 per cent culls et cetera in the field run. The above allowance had been made quite arbitrarily.

^{1/} Implicit in the above is the assumption that the market is perfect or nearly perfect so that produce moves into the market at the cost allowing only for normal profits to the producers. The period of time involved must also be assumed long enough to allow the pattern of distribution to be established on the basis of the costs of production, transportation and storage. It must also be assumed that no product differentiation exists.

^{2/} Field run vegetables refer to the vegetables that are harvested from the field before washing and grading are performed.

Table IV.- The Quantity of Produce Originating in Alberta Destined for the Western Canadian Market and the Percentage that is Sold in Alberta: Based on A Five Year Average, July 1955 through June, 1960

	Group I			Group II			Group III	
	Potatoes	Turnips	Corn	Cabbage	Carrots	Onions	Tomatoes	Celery
Total commercial production grown in Alberta; in '000 lb.	77,736	7,149	1,497	3,097	1,025	604	33	16
Total sold in Alberta; in '000 lb.	54,167	3,305	1,247	2,721	1,025	427	33	16
In per cent	69.7	46.2	83.3	87.8	100.0	70.7	100.0	100.0

Source: Appendix II.

If there is a bias it is suggested that the allowance made for culls et cetera, is over-estimated rather than under-estimated. Discrepancies in these adjustments, however, are probably not large enough to distort the relative acreage requirements of the different vegetables as shown at the bottom of Table V. This is also true of the yield per acre estimates.

In line 4 of Table V the number of acres that are required to satisfy the given commercial market have been calculated. These estimates represent the total acreage that would supply the commercial market in Western Canada for the period of one year, given the above conditions. However, Alberta's acreage requirements are proportional to its share in the market. Consequently, line 6 in Table V shows the number of acres required of each vegetable to satisfy Alberta's share of the market.

Whether or not Alberta can capture a larger share of the Western Canadian market is in part dependent upon Alberta producers lowering their costs of production through specialization and large scale operations. The difficulties are intensified if the size of the market that is currently available is too small to allow specialization and large scale operations to occur.

It may be interesting at this stage to note the influence that urban centers have exerted upon the local production of fresh vegetables in two of the other Western Provinces. From Charts 1-1A to 8-8A, it may be noted that "in season" local supplies account for more than 50 per cent of each of the eight commodities that enter the Manitoba market. Undoubtedly there are other factors involved, but it seems reasonable to believe that the main stimulus to local production has been the market provided by Metropolitan Winnipeg, which according to the 1956 Census, had a population of 490 thousand.

In contrast, not one of the eight commodities was supplied to the extent of 50 per cent during the "in season" by local producers in Saskatchewan. While it is generally true that the climate in Saskatchewan is less suitable to vegetable production than that of the other three Western Provinces, this is not necessarily true in the case of potatoes and turnips. There are areas in Saskatchewan reasonably close to Regina and Saskatoon that are suited to the production of potatoes and turnips. Neither city, however, has a large population. According to the 1956 Census, Regina had a population of 89 thousand and Saskatoon had a population of 72 thousand. It seems reasonable to believe that as growth takes place within these cities, they, too, will develop their own vegetable market sheds, at least for the commodities that are most adaptable to those specific regions. It is suggested that the main stimulus to the production of fresh vegetables in local areas comes from urbanization. When one takes into account seasonality in production it seems reasonable to suggest that the cities of Regina and Saskatoon are too small to encourage the production of vegetables on a large commercial scale.

On the other hand it would appear that the market in Winnipeg for commercial grown vegetables is large enough to support numerous local growers. It also seems reasonable to believe that the Winnipeg market is large enough to encourage specialization in different commodities

Table V.-- The Number of Acres Required to Satisfy the Commercial Market in Western Canada for Eight Fresh Vegetables for a Period of One Year: Based on a Five Year Average July 1955 through June 1960

	Group I			Group II			Group III		
	Potatoes:	Turnips :	Corn :	Cabbage:	Carrots:	Onions:	Tomatoes:	Celery	
Size of the commercial market in Western Canada; in '000 lb. <u>a/</u>	351,177	18,237	9,095	39,012	40,477	50,023	56,911	30,626	
Estimated quantity of field run vegetables to satisfy the market; in '000 lb. <u>b/</u>	540,272	28,057	13,992	60,018	62,272	76,958	87,555	47,117	
Average yield per acre in cwt. <u>c/</u>	140	200	70	200	160	120	150	200	
Acres required to satisfy markets in Western Canada	38,591	1,403	1,999	3,001	3,892	6,413	5,837	2,356	
Alberta's share of the market in Western Canada in per cent <u>d/</u>	22.1	39.2	16.4	7.9	2.5	1.2	0.05	0.05	
Acres required to satisfy Alberta's share of the market in Western Canada	8,529	550	328	237	97	77	3	1	

a/ Appendix I.

b/ It was estimated that for the period 1955 to 1960 approximately 65 per cent of the commercially grown vegetables were graded and placed on the commercial market. The remaining 35 per cent is an allowance for culls, waste, shrinkage, spoilage, storage loss, seed and self supplies.

c/ The average yields per acre are for the irrigation districts in Southern Alberta. They are based upon estimates made by staff of the Canada Research Station, Lethbridge, and upon estimates made by staff of the Field Crops Branch, Alberta Department of Agriculture.

d/ Table III, line 3, page 25.

by the local growers.^{1/} A situation then, in which there is a large number of producers may give rise to a market in which on the supply side the producers approach the state of perfect competition. In this case one would expect the wholesale prices that are paid for domestic-grown produce to be lower than in markets which are less competitive on the supply side. The supposition that a relatively high degree of local competition does exist on the supply side in the Manitoba market may in part explain the earlier observation made from Figures 3 through 10, that wholesale prices are generally lower in Manitoba than in the other three provinces.

Let us now return to Alberta's position as an area of supply to Western Canada. It was previously mentioned that specialization in potato production has definitely taken place within the province. Evidence in Table V bears this out. It is shown in the Table that with the given estimates of yield per acre and allowance for culls, et cetera, the number of acres required to satisfy Alberta's share of the market in Western Canada for the given period was 8,529 acres. Without specifying the size of an optimum production unit, it is, nevertheless obvious that such a large acreage allows a number of producers to specialize in the production of potatoes. The situation is much different for the other vegetables listed. Two growers, each with 275 acres of turnips could satisfy Alberta's share of the turnip market, or one grower with 80 acres, could satisfy Alberta's share of onions. In reality, a number of growers, each with only a few acres, account for most of the vegetables grown in Alberta, other than potatoes and possibly turnips. The incentive to specialize must of course be the result of a stimulus from the market, or potential market. In the case of potatoes the rapidly growing cities of Edmonton and Calgary along with the relatively high per capita consumption of potatoes provided this stimulus. In the case of turnips, corn, cabbage, carrots and onions, the relatively low per capita consumption provided a much slower shift in the demand for these commodities, hence, a much weaker stimulus for specialization in the production of these commodities on the part of

^{1/} An example of the influence of size of farm upon the cost of producing potatoes is illustrated by a study conducted by the University of Idaho. The results of this study showed the cost per hundredweight of producing potatoes on 60-100 acres was \$1.20; on 121-200 acres \$1.12; on 201-280 acres \$1.05; and on 281-400 acres only \$0.98. These results point out that there are decreasing costs per unit of output with an increase in the scale of operations. There is, of course, an optimum scale of operations beyond which diseconomies occur with an increase in scale. See: Weber, Jack and Elwood Jones, Analysis of Production Costs on Potato Farms in Southeastern Idaho, University of Idaho Agricultural Experimental Station, Progress Report, No. 33, November, 1959.

With regard to other vegetables the scale reached with apparent success is exemplified by the Kosuga farm at Pine Island, New York. The acreage for 1961 included 40 acres of radishes, 150 acres of lettuce, 300 acres of celery and approximately 350 acres of onions. See: The Packer, National Weekly Business Newspaper of Vegetable Growers and Shippers, Chicago, July 1, 1961.

local growers. Field production of tomatoes and celery in Alberta on a commercial basis is of course deterred by climatic conditions.

Growth in the size of the commercial market is relatively slow as compared to the speed with which the output of any of the above commodities can be expanded. In Table VI, the number of people that one acre will supply through the commercial market for a period of one year has been calculated for each of the commodities. In this table the yields per acre were estimated as representative of the crops grown in the irrigation districts of Southern Alberta. Included in the calculation was a liberal allowance for wastage. Accordingly, if a bias exists it should tend to minimize the number of people per acre. It will be noted from the table that one acre of potatoes will supply approximately 63 people for a period of one year. In contrast, one acre of turnips will supply approximately 2,453 people, or nearly 40 times as many people. This is an indication then, of the rapidity with which production can expand relative to an increase in consumption. From a slightly different point of view, it is an indication of the growth that must occur in the urban population to warrant an increase in production by the amount of one acre.^{1/}

Two other points should be made clear; first, the influence of seasonality upon the "people per acre" estimates, and second, the manner in which technology and specialization will affect the "people per acre" estimates.

In regard to the influence of seasonality upon the "people per acre" estimates, it should be pointed out that the estimates refer to the period of one year. The production of these crops, however, is seasonal. Likewise, the time during which the crops may be stored is only some fraction of the year. Consequently, one acre of land will satisfy a greater number of people during some fraction of the year than it will over the course of the entire year. As an example, in Alberta the length of the potato season plus the length of the storage season of potatoes, is approximately ten months. The number of people that one acre of Alberta grown potatoes will satisfy during the period of ten months is $\frac{12}{10} \times 63 = 76$ people. Corn is an exception,

because it is consumed on a seasonal basis as it is produced. The point is, for those commodities which we assume to have a constant demand throughout the year, the shorter the period of production and storage the larger is the number of people that one acre of produce can satisfy. Once again this is indicative of the growth that must take place in the size of the commercial market in Western Canada, and particularly in Alberta, to warrant specialization in the field production of the vegetables included in Groups II and III.

The total output of a commodity may expand for reasons other than an increase in the acreage of that commodity. Ignoring the effects of erratic changes that may occur as the result of weather conditions, the total output per acre may increase over time due to the adoption of new techniques and innovations in production. By the same token, any increase in efficiency in the marketing chain which

^{1/} Given, of course, the existing market prices with no changes in the per capita consumption.

Table VI.- The Number of People that One Acre will Supply through the Commercial Market: Based on the per Capita Consumption in Western Canada of Eight Fresh Vegetables

	Group I		Group II			Group III		
	Potatoes	Turnips	Corn	Cabbage	Carrots	Onions	Tomatoes	Celery
Per capita consumption in lb. <u>a/</u>	144.2	5.3	3.8	12.2	12.6	15.1	16.7	7.3
Yield per acre, field run, cwt.	140.0	200.0	70.0	200.0	160.0	120.0	150.0	200.0
Yield per acre, at commercial market, cwt. <u>b/</u>	91.0	130.0	45.5	130.0	104.0	78.0	97.5	130.0
people per acre	63	2,453	1,197	1,066	825	516	584	1,781

a/ Per Capita Consumption estimates of the fresh vegetables in Western Canada based upon the "Apparent per capita disappearance of certain vegetables in Canada, 1940-1959", Dominion Bureau of Statistics.

b/ Allowance has been made for culls, wastage, spoilage, etc., as shown in footnote b/, Table V, page 29.

eliminates wastage of produce may increase the number of people that one acre of produce can satisfy. Since the adoption of new techniques and innovations is usually associated with specialization in production, it seems likely that as long as the size of the market which is available to a specific region of supply does not warrant specialization in production, any tendency toward specialization would in fact be self-defeating. This would be true if the size of the market that is available to the specific area of supply is fixed. The size of the market that is available to a specific area of supply is not fixed. There is an inverse relationship between the size of the market which is available to the specific market area and the costs of production and the costs of distribution relative to that area. Thus as specialization of production takes place within a specific area of supply the internal and external economies that are associated with specialization may lower the costs of production and of distribution to the extent that the increase in the market which that area may capture may be a substantial amount.

It can be seen, therefore, that growth in the local commercial markets is important to the Alberta producers. For it is within these local markets that the Alberta producers have a locational advantage. And, in the initial stages of a growing commercial market, the local markets are the most accessible to the provincial growers. Hence, if the Alberta market grows at a faster rate than other markets in Western Canada, the Alberta producers are in a fortunate position for it means that they will thereby enhance their position in the Western Canadian market relative to other provincial areas of supply.

CHAPTER V

SUMMARY

The situation that we are dealing with is dynamic. Change is continually taking place both on the demand side and the supply side of the markets in Western Canada for the eight fresh vegetables under study. Because of the impossible task of deriving supply and demand curves the analysis in this study has been conducted in terms of the size of the commercial market. Growth in the size of the market is considered as analogous to the demand side of the market. The costs of production and the costs of distribution from different areas of supply and the comparative advantage of the respective areas are considered as pertaining to the supply side of the market. There are numerous factors which are involved that determine the comparative advantage of any one area at a specific point in time. Assuming, however, that movements of produce are relatively unrestricted, the comparative advantage of any one area of supply can be and is decided on the basis of lowest costs. The costs of production and distribution are in part a reflection of the physical characteristics and the storage characteristics of the vegetables in question. It is, however, the size

of the market that is available to a specific area of supply that determines the type of production and the degree of specialization that will take place in that area at any given time. The size of the market available to any specific area of supply is a complex thing determined on the basis of the relationships that exist between the costs of production and distribution, the seasonality of the product, and the size of the population that is dependent upon the commercial market. For the purposes of this study the size of the available market area is confined within the limits of the geographic area of Western Canada and the period of one year.

The size of the market that is available to Alberta producers is different for the different commodities. The most important determinants of the size of the market to Alberta producers are: the size of the population in urban centers within the province, the per capita consumption of the product, and the length of the harvest season plus the length of the storage season of the commodity. Of the eight commodities included in this study, potatoes alone are produced under conditions of specialized large scale production within the province. Potatoes are unique among the eight commodities inasmuch as their growth is well adapted to the climatic conditions of Alberta, the "in season" plus the storage season, make it feasible to market Alberta grown potatoes for at least ten months of the year and the high per capita consumption of potatoes multiplied by the urban population within Alberta, provides local growers with a large market in which they have a locational advantage. Consequently, the acreage that is required to satisfy the provincial market is large enough to stimulate specialization and large scale production of potatoes within the province. Specialization and large scale production of potatoes in turn give Alberta producers an advantage in enlarging their share of the market for potatoes in the other Western Provinces.

The only difference between potatoes and turnips is that the per capita consumption of turnips is very low. Consequently, the number of acres required by Alberta producers to satisfy the market is much less.

The length of the marketing season for Alberta grown corn, cabbages, carrots and onions, is relatively short. Consequently the available market is relatively small and likewise the number of acres required to satisfy that market is not large enough to warrant specialization or large scale production of these commodities within Alberta at the present time. Because one acre can satisfy a large number of people through the commercial market, growth in the commercial market from the producer's point of view is necessarily slow. This is especially true in the case of Alberta producers whose marketing season for the above products is relatively short, hence the number of people that one acre will satisfy is very large.

The marketing season for Alberta grown tomatoes and celery is also short. At the present time, the main inhibitants to expansion of production in Alberta of these commodities are the costs of production and the quality of produce as compared to alternative areas of supply such as California and Mexico.

The fundamental reasons that explain Alberta's rather small share of the market in Alberta and in Western Canada for the majority of the eight commodities in question can be stated in terms of the comparative advantage of Alberta as an area of supply relative to the many other areas of supply to Western Canada. The comparative advantage is determined on the basis of lowest costs of placing a commodity into a specific market area. The costs are in turn determined by a number of complex factors including the growth and storage characteristics of the commodity, the seasonality of the commodity, proximity of the area of supply to the market area, and the size of the available market (particularly the size of the local market). While it is no doubt true that there are other barriers in the chain of marketing, such as the lack of continuity of supply on the part of Alberta producers, a lack of contact between the grower and wholesaler, and the lack of modern processing of Alberta grown fresh vegetables, it would appear that these latter barriers are secondary and perhaps a symptom, of the more fundamental barriers associated with comparative advantage.

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APPENDICES

Appendix I is a series of tables which show an estimated quantity of each vegetable that entered the commercial market each month in the individual provinces averaged over the five-year period July 1, 1955 to June 1, 1960. This estimate was calculated from total imports into each province plus domestically grown produce unloaded at six major cities in Western Canada. Since the latter represented only a portion of the total domestically grown produce to enter the commercial market it was adjusted upwards by an appropriate amount. The factor used in making this adjustment was based upon the ratio of the population in the six major cities to the urban population of the provinces, respectively. Thus, in Manitoba the City of Winnipeg was approximately 73.7 per cent of the urban population, July 1, 1955 to June 30, 1960. The quantity of domestic-grown produce that entered the commercial market in Winnipeg was divided by 73.7 to give an estimate of the quantity of domestic-grown produce that entered the commercial market in Manitoba. To this the total imports into Manitoba were added to give an estimate of the size of the commercial market in that Province. A similar procedure was used to estimate the size of the commercial market in each of the other provinces.

The total imports were obtained from published and unpublished data compiled by the Dominion Bureau of Statistics. In the data are recorded the quantity of each commodity that entered Canada each month according to the country of origin and the province in which the port of entry was located. Data showing the unloads of domestically grown produce at six major cities in Western Canada were obtained from the Annual Unload Report Fresh Fruit and Vegetables on 12 Canadian Markets, published by the Canada Department of Agriculture, Ottawa. The data in the above report are compiled in the following manner: Wholesale firms and licensed vegetable dealers in each of the major cities report daily the quantity of each commodity that is unloaded on their premises, to Federal Fruit and Vegetable inspectors. The daily report also includes the origin of the produce, the type of carrier, and the average wholesale price paid for each commodity. The Fruit and Vegetable inspectors convert the quantity of each commodity that is reported into carlot equivalents. This along with the other information, they send once a week to Ottawa, where the data from 12 cities in Canada are compiled and published. The six cities in Western Canada which are included in this report are: Winnipeg, Regina, Saskatoon, Calgary, Edmonton and Vancouver.

Appendix II consists of a series of tables that show the estimated quantity of Alberta grown produce that has entered the commercial markets in Western Canada averaged over the five-year period, July 1, 1955 to June 30, 1960. These tables were compiled from the Annual Unload Report Fresh Fruit and Vegetables on 12 Canadian Markets. The same type of adjustment was used to calculate the quantities shown in Appendix II as that used in Appendix I.

APPENDIX I

Table A1.- Estimated Size of Commercial Market for Fresh Cabbage in Western Canada, Based on a Five Year Average, July 1, 1955 to June 30, 1960

Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	: Western Canada
- in '000 lb. -					
July	941	381	635	1,065	3,022
August	777	108	393	778	2,056
September	906	116	367	900	2,289
October	1,194	289	560	1,086	3,129
November	1,286	294	727	1,007	3,314
December	1,135	381	756	1,028	3,300
January	1,001	407	841	1,154	3,403
February	729	438	846	1,314	3,327
March	903	503	1,026	1,435	3,867
April	753	550	904	1,401	3,608
May	864	537	947	1,281	3,629
June	923	594	1,163	1,388	4,068
Total	11,412	4,598	9,165	13,837	39,012

Table A2.- Estimated Size of the Commercial Market for Fresh Carrots in Western Canada, Based on a Five Year Average, July 1, 1955 to June 30, 1960

Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	: Western Canada
- in 000 lb. -					
July	483	254	763	1,840	3,340
August	501	119	367	2,101	3,088
September	797	110	336	1,399	2,642
October	1,008	128	515	1,274	2,925
November	977	232	532	2,011	3,752
December	1,000	289	703	1,871	3,863
January	1,062	316	662	1,594	3,634
February	901	337	741	1,702	3,681
March	812	365	618	1,820	3,615
April	717	421	623	1,824	3,585
May	678	296	652	1,768	3,394
June	576	232	574	1,576	2,958
Total	9,512	3,099	7,086	20,780	40,477

Table A3.- Estimated Size of Commercial Market for Fresh Celery in Western Canada, Based on a Five Year Average, July 1, 1955 to June 30, 1960

Month	: : Manitoba	: : Saskatchewan	: : Alberta	: : British : Columbia	: : Western : Canada
	- in '000 lb. -				
July	481	246	633	1,296	2,656
August	504	191	434	1,184	2,313
September	490	176	372	1,283	2,321
October	396	243	488	1,490	2,617
November	338	253	534	653	1,778
December	477	409	661	1,423	2,970
January	434	318	762	1,248	2,762
February	392	328	604	1,097	2,421
March	441	339	756	1,198	2,734
April	462	380	676	1,168	2,686
May	441	346	728	1,234	2,749
June	408	359	694	1,158	2,619
Total	5,264	3,588	7,342	14,432	30,626

Table A4.- Estimated Size of the Commercial Market for Fresh Corn in Western Canada, Based on a Five Year Average, July 1, 1955 to June 30, 1960

Month	: : Manitoba	: : Saskatchewan	: : Alberta	: : British : Columbia	: : Western : Canada
	- in '000 lb. -				
July	233	82	477	952	1,744
August	925	364	742	1,226	3,257
September	462	209	549	1,149	2,369
October	21		98	242	361
November	10		34	62	106
December			29	19	48
January					
February				5	5
March				5	5
April	10		19	29	58
May	43	24	38	173	278
June	67	48	226	523	864
Total	1,771	727	2,212	4,385	9,095

Table A5.- Estimated Size of Commercial Market for Dry Onions in Western Canada, Based on a Five Year Average, July 1, 1955 to June 30, 1960

Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	: Western Canada
- in '000 lb. -					
July	635	434	631	1,571	3,271
August	937	479	891	1,222	3,529
September	1,754	831	1,324	1,585	5,494
October	2,106	1,018	1,072	1,782	5,978
November	1,269	441	892	1,322	3,924
December	1,081	348	614	1,434	3,477
January	1,457	770	911	1,510	4,648
February	1,349	599	943	1,452	4,343
March	1,091	561	1,040	1,852	4,544
April	681	464	741	2,078	3,964
May	663	361	917	1,363	3,304
June	767	463	944	1,373	3,547
Total	13,790	6,769	10,920	18,544	50,023

Table A6.- Estimated Size of the Commercial Market for Table Potatoes in Western Canada, Based on a Five Year Average, July 1, 1955 to June 30, 1960

Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	: Western Canada
- in '000 lb. -					
July	5,763	3,948	7,875	14,869	32,455
August	7,710	2,532	5,469	13,813	29,524
September	7,401	2,458	4,696	14,226	28,781
October	9,335	3,820	4,816	15,711	33,682
November	7,442	3,735	5,321	13,271	29,769
December	5,403	2,661	4,810	12,524	25,398
January	6,267	3,250	5,863	14,530	29,910
February	6,762	3,062	5,286	12,494	27,604
March	7,497	4,152	6,339	13,348	31,336
April	6,169	3,600	5,172	12,564	27,505
May	5,526	2,526	5,434	11,461	24,947
June	6,260	2,855	6,278	14,873	30,266
Total	81,535	38,599	67,359	163,684	351,177

Table A7.- Estimated Size of Commercial Market for Fresh Tomatoes in Western Canada Based on a Five Year Average, July 1, 1955 to June 30, 1960

Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	: Western Canada
- in '000 lb. -					
July	1,362	980	1,464	3,005	6,811
August	2,034	1,506	2,641	3,125	9,306
September	1,407	688	1,340	1,944	5,379
October	588	405	917	1,549	3,459
November	616	383	873	1,359	3,231
December	643	353	661	999	2,656
January	739	402	885	1,229	3,255
February	679	390	892	1,108	3,069
March	796	414	933	1,245	3,388
April	989	491	1,006	1,405	3,891
May	1,112	569	1,199	2,599	5,479
June	1,346	733	1,552	3,356	6,987
Total	12,311	7,314	14,363	22,923	56,911

Table A8.- Estimated Size of the Commercial Market for Turnips in Western Canada, Based on a Five Year Average, July 1, 1955 to June 30, 1960

Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	: Western Canada
- in '000 lb. -					
July	81	62	177	522	842
August	242	31	135	367	775
September	492		193	607	1,292
October	824	62	366	745	1,997
November	636	94	424	642	1,796
December	573	141	424	843	1,981
January	779	156	501	881	2,317
February	591	78	549	794	2,012
March	591	219	501	931	2,242
April	582	109	366	534	1,591
May	376	62	241	231	910
June	179	31	87	185	482
Total	5,946	1,045	3,964	7,282	18,237

APPENDIX II

Table B1.- Estimated Entry of Alberta Grown Fresh Cabbage into the Commercial Markets of Western Canada, Based on a Five Year Average, July 1, 1955 to June 30, 1960

Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	: Western Canada
- in '000 lb. -					
July			46		46
August			319		319
September		12	365		377
October		49	516		565
November		86	592		678
December		49	405	28	482
January	35	74	235	18	362
February		25	144		169
March			84		84
April			15		15
May					
June					
Total	35	295	2,721	46	3,097

Table B2.- Estimated Entry of Alberta Grown Fresh Carrots into the Commercial Markets of Western Canada, Based on a Five Year Average July 1, 1955 to June 30, 1960

Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	: Western Canada
- in '000 lb. -					
July					
August			53		53
September			201		201
October			263		263
November			193		193
December			131		131
January			96		96
February			53		53
March			26		26
April			9		9
May					
June					
Total			1,025		1,025

Table B3.- Estimated Entry of Alberta Grown Fresh Celery into the Commercial Markets of Western Canada, Based on a Five Year Average, July 1, 1955 to June 30, 1960

Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	: Western Canada
- in '000 lb. -					
July					
August					
September			16		16
October					
November					
December					
January					
February					
March					
April					
May					
June					
Total			16		16

Table B4.- Estimated Entry of Alberta Grown Fresh Corn into the Commercial Markets of Western Canada, Based on a Five Year Average, July 1, 1955 to June 30, 1960

Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	: Western Canada
- in '000 lb. -					
July					
August		125	708		833
September		125	539		664
October					
November					
December					
January					
February					
March					
April					
May					
June					
Total		250	1,247		1,497

Table B5.- Estimated Entry of Alberta Grown Dry Onions into the Commercial Markets of Western Canada, Based on a Five Year Average, July 1, 1955 to June 30, 1960

Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	:: Western Canada
- in '000 lb. -					
July					
August					
September		48	20		68
October		16	79		95
November		113	169		282
December			139		139
January			10		10
February			10		10
March					
April					
May					
June					
Total		177	427		604

Table B6.- Estimated Entry of Alberta Grown Table Potatoes into the Commercial Markets of Western Canada, Based on a Five Year Average July 1, 1955 to June 30, 1960

Month	: Manitoba	: Saskatchewan	: Alberta	: British Columbia	:: Western Canada
- in '000 lb. -					
July	11	76	1,576		1,663
August		586	4,929		5,515
September	43	1,002	4,497	14	5,556
October	239	1,929	4,800	69	7,037
November	163	2,610	5,302	708	8,783
December	76	1,532	4,800	764	7,172
January	98	1,645	5,828	750	8,321
February	337	1,607	5,232	792	7,968
March	651	2,194	6,260	667	9,772
April	488	1,608	4,742	944	7,782
May	43	889	4,181	514	5,627
June		284	2,020	236	2,540
Total	2,149	15,962	54,167	5,458	77,736

Table B7.- Estimated Entry of Alberta Grown Fresh Tomatoes into the Commercial Markets of Western Canada, Based on a Five Year Average, July 1, 1955 to June 30, 1960

Month	:	:	:	:	British	:	Western
	:	Manitoba	Saskatchewan	Alberta	Columbia	:	Canada
- in '000 lb. -							
July				8			8
August							
September							
October							
November							
December							
January							
February							
March							
April							
May							
June				25			25
Total				33			33

Table B8.- Estimated Entry of Alberta Grown Table Turnips into the Commercial Markets of Western Canada, Based on a Five Year Average, July 1, 1955 to June 30, 1960

Month	:	:	:	:	British	:	Western
	:	Manitoba	Saskatchewan	Alberta	Columbia	:	Canada
- in '000 lb. -							
July							
August				115	46		161
September				193	240		433
October				366	321		687
November			31	386	206		623
December			31	395	344		770
January	18		31	491	585		1,125
February	27		16	540	618		1,201
March				424	630		1,054
April			31	251	481		763
May			16	96	172		284
June				48			48
Total	45	156		3,305	3,643		7,149

